(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 June 2002 (20.06.2002)

PCT

(10) International Publication Number
WO 02/48115 A2

(51) International Patent Classification[7]: C07D 239/00

(21) International Application Number: PCT/US01/46629

(22) International Filing Date: 3 December 2001 (03.12.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/254,614 11 December 2000 (11.12.2000) US

(71) Applicant *(for all designated States except US)*: **E. I. DU PONT DE NEMOURS AND COMPANY** [US/US]; 1007 Market Street, Wilmington, DE 19898 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ANNIS, Gary, David** [US/US]; 13 Franklin Road, Landenberg, PA 19350 (US). **MYERS, Brian, James** [US/US]; 102 East Ruddy Duck Circle, Oxford, PA 19363 (US). **SELBY, Thomas, Paul** [US/US]; 116 Hunter Court, Wilmington, DE 19808 (US). **STEVENSON, Thomas, Martin** [US/US]; 103 Iroquois Court, Newark, DE 19702 (US). **ZIMMERMAN, William, Thomas** [US/US]; 1 Evans Drive, Landenberg, PA 19350 (US).

(74) Agent: **BIRCH, Linda, D.**; E. I. Du Pont de Nemours and Company, Legal Patent Records Center, 1007 Market Street, Wilmington, DE 19898 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

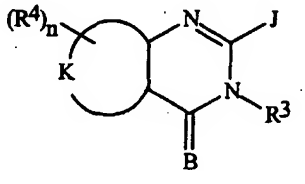
(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 02/48115 A2

(54) Title: QUINAZOLINONES AND PYRIDINYLPYRIMIDINONES FOR CONTROLLING INVERTEBRATE PESTS



(I)

(57) Abstract: This invention provides methods for controlling invertebrate pests comprising contacting the pests or their environment with an arthropodicidally effective amount of a compound of Formula (I), its N-oxides or agriculturally suitable salts wherein B, J, K, R^3 and R^4 and n are as defined in the disclosure.This invention also pertains to certain compounds of Formula (I) and compositions for controlling invertebrate pests comprising a biologically effective amount of a compound of Formula I and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents.

TITLE

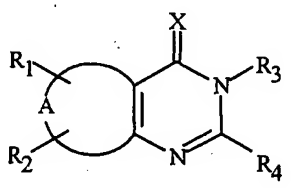
QUINAZOLINONES AND PYRIDINYLPYRIMIDINONES FOR CONTROLLING INVERTEBRATE PESTS

BACKGROUND OF THE INVENTION

This invention relates to certain quinazolinones and pyridinylpyrimidinones, their *N*-oxides, agriculturally suitable salts and compositions, and a method of use for controlling invertebrate pests in both agronomic and nonagronomic environments.

The control of invertebrate pests is extremely important in achieving high crop efficiency. Damage by invertebrate pests to growing and stored agronomic crops can cause significant reduction in productivity and thereby result in increased costs to the consumer. The control of invertebrate pests in forestry, greenhouse crops, ornamentals, nursery crops, stored food and fiber products, livestock, household, and public and animal health is also important. Many products are commercially available for these purposes, but the need continues for new compounds that are more effective, less costly, less toxic, environmentally safer or have different modes of action.

WO 99/14202 discloses pyrimidin-4-one and pyrimidin-4-thiones of Formula i as fungicides



i

wherein, inter alia,

X is O or S;

A is fused phenyl or pyridyl;

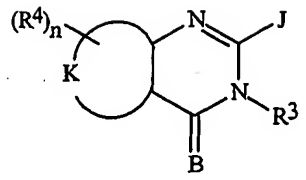
R_1 and R_2 are selected from H, halogen or trimethylsilyl;

R_3 is C_1-C_8 alkyl, C_1-C_8 alkenyl or C_1-C_8 alkynyl, each optionally substituted; and

R_4 is optionally substituted phenyl.

SUMMARY OF THE INVENTION

This invention pertains to a method for controlling an invertebrate pest comprising contacting the invertebrate pest or its environment with a biologically effective amount of a compound of Formula I, its *N*-oxide or an agriculturally suitable salt of the compound (e.g., as a composition described herein)



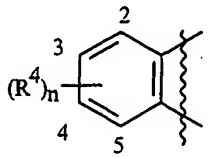
I

wherein

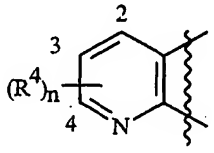
B is O or S;

J is a phenyl ring substituted with 1 to 4 R^5, or a naphthyl ring system, a 5- or 6-membered heteroaromatic ring or an aromatic 8-, 9- or 10-membered fused heterobicyclic ring system wherein each ring or ring system is optionally substituted with 1 to 4 R^5;

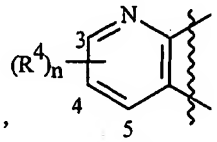
K is, together with the two contiguous linking carbon atoms, a fused phenyl or a fused pyridinyl ring selected from the group consisting of K-1, K-2, K-3, K-4 and K-5, each optionally substituted with 1 to 4 R^4



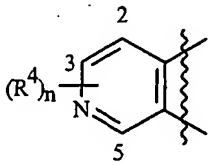
K-1



K-2

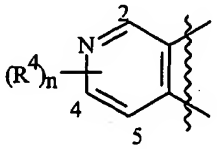


K-3



K-4

or



K-5 ;

R^3 is G; C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, each optionally substituted with one or more substituents selected from the group consisting of halogen, G, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylcarbonyl, C_3-C_6 trialkylsilyl, or a phenoxy ring optionally substituted with one to three substituents independently selected from R^6; hydroxy; C_1-C_4 alkoxy; C_1-C_4 alkylamino; C_2-C_8 dialkylamino; C_3-C_6 cycloalkylamino; C_2-C_6 alkoxycarbonyl or C_2-C_6 alkylcarbonyl;

G is a phenyl ring or 5- or 6-membered heteroaromatic ring, each ring optionally substituted with one to three substituents independently selected from R^6; a 5- or 6-membered nonaromatic carbocyclic or heterocyclic ring, optionally including

one or two ring members selected from the group consisting of C(=O), SO or $S(O)_2$ and optionally substituted with 1 to 4 substituents selected from R^{12};

each R^4 is independently H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_1–C_4 alkoxyalkyl, C_1–C_4 hydroxyalkyl, $C(O)R^{10}$, CO_2R^{10}, $C(O)NR^{10}R^{11}$, $NR^{10}R^{11}$, $N(R^{11})COR^{10}$, $N(R^{11})CO_2R^{10}$ or C_3-C_6 trialkylsilyl; or

each R^4 is independently a phenyl, benzyl, phenoxy or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with one to three substituents independently selected from R^6;

each R^5 is independently H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, CO_2H, $CONH_2$, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_2-C_6 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl, C_3-C_6 trialkylsilyl; or

each R^5 is independently a phenyl, benzyl, benzoyl, phenoxy, 5- or 6-membered heteroaromatic ring or an aromatic 8-, 9- or 10-membered fused heterobicyclic ring system, each ring optionally substituted with one to three substituents independently selected from R^6; or

$(R^5)_2$ when attached to adjacent carbon atoms can be taken together as $-OCF_2O-$, $-CF_2CF_2O-$, or $-OCF_2CF_2O-$;

each R^6 is independently C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl;

R^{10} is H or C_1–C_4 alkyl or C_1–C_4 haloalkyl;

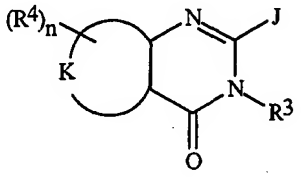
R^{11} is H or C_1–C_4 alkyl;

each R^{12} is independently C_1-C_2 alkyl, halogen, CN, NO_2 and C_1-C_2 alkoxy; and

n is 1 to 4.

This invention also relates to such a method wherein the invertebrate pest or its environment is contacted with a biologically effective amount of a compound of Formula I or a composition comprising a compound of Formula I and a biologically effective amount of at least one additional compound or agent for controlling invertebrate pests.

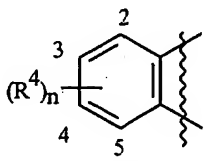
This invention also pertains to a compound of Formula Ia, its *N*-oxide or an agriculturally suitable salt of the compound



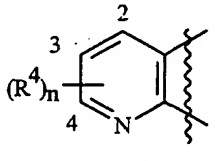
Ia

wherein

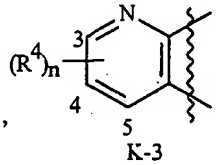
K is, together with the two contiguous linking carbon atoms, a fused phenyl or a fused pyridinyl ring selected from the group consisting of K-1, K-2, K-3, K-4 and K-5, each optionally substituted with 1 to 4 R^4



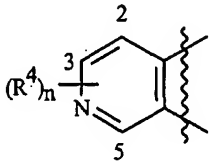
K-1



K-2

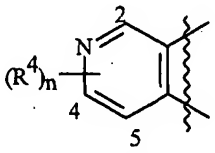


K-3



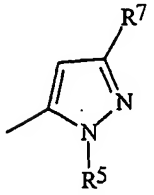
K-4

or

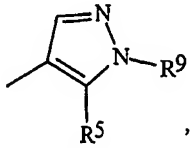


K-5 ;

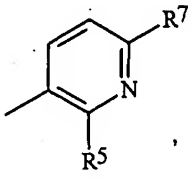
J substituted with 1 to 3 R^5 is selected from the group consisting of J-6, J-7, J-8, J-9, J-10, J-11, J-12 and J-13



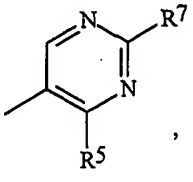
J-6



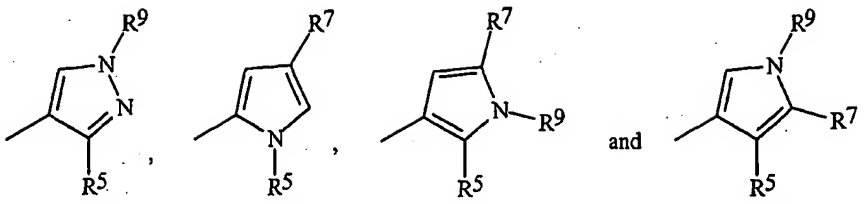
J-7



J-8



J-9



J-10 J-11 J-12 J-13

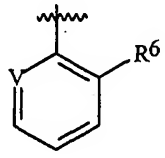
;

R^3 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl or C_3-C_6 cycloalkyl each optionally substituted with one or more substituents selected from the group consisting of halogen, CN, C_1-C_2 alkoxy, C_1-C_2 alkylthio, C_1-C_2 alkylsulfinyl and C_1-C_2 alkylsulfonyl;

one R^4 group is attached to the K-ring at the 2-position or 5-position, and said R^4 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, or C_1-C_4 haloalkylsulfonyl; and

an optional second R^4 is H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_1–C_4 alkoxyalkyl, C_1–C_4 hydroxyalkyl, $C(O)R^{10}$, CO_2R^{10}, $C(O)NR^{10}R^{11}$, $NR^{10}R^{11}$, $N(R^{11})COR^{10}$, $N(R^{11})CO_2R^{10}$ or C_3-C_6 trialkylsilyl;

R^5 is



;

V is N, CH, CF, CCl, CBr or CI;

each R^6 is independently C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl;

each R^7 is independently H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, halogen, CN, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy or C_1-C_4 haloalkylthio;

R^9 is H, C_2-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_6 alkenyl, C_3-C_6 haloalkenyl, C_3-C_6 alkynyl or C_3-C_6 haloalkynyl, provided that R^7 and R^9 are not both H;

R^{10} is H or C_1–C_4 alkyl or C_1–C_4 haloalkyl;

R^{11} is H or C_1–C_4 alkyl; and

n is 0, 1 or 2.

This invention also pertains to a composition for controlling an invertebrate pest comprising a biologically effective amount of a compound of Formula Ia and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents. This invention also pertains to a composition comprising a biologically effective amount of a compound of Formula Ia and an effective amount of at least one additional biologically active compound or agent.

DETAILS OF THE INVENTION

In the above recitations, the term "alkyl", used either alone or in compound words such as "alkylthio" or "haloalkyl" includes straight-chain or branched alkyl, such as methyl, ethyl, *n*-propyl, *i*-propyl, or the different butyl, pentyl or hexyl isomers. "Alkenyl" includes straight-chain or branched alkenes such as 1-propenyl, 2-propenyl, and the different butenyl, pentenyl and hexenyl isomers. "Alkenyl" can also include polyenes such as 1,2-propadienyl and 2,4-hexadienyl. "Alkynyl" includes straight-chain or branched alkynes such as 1-propynyl, 2-propynyl and the different butynyl, pentynyl and hexynyl isomers. "Alkynyl" can also include moieties comprised of multiple triple bonds such as 2,5-hexadiynyl. "Alkoxy" includes, for example, methoxy, ethoxy, *n*-propyloxy, isopropyloxy and the different butoxy, pentoxy and hexyloxy isomers. "Alkoxyalkyl" denotes alkoxy substitution on alkyl. Examples of "alkoxyalkyl" include CH_3OCH_2, $CH_3OCH_2CH_2$, $CH_3CH_2OCH_2$, $CH_3CH_2CH_2CH_2OCH_2$ and $CH_3CH_2OCH_2CH_2$. "Alkylthio" includes branched or straight-chain alkylthio moieties such as methylthio, ethylthio, and the different propylthio, butylthio, pentylthio and hexylthio isomers. "Cycloalkyl" includes, for example, cyclopropyl, cyclobutyl, cyclopentyl and cyclohexyl.

The term "heteroaromatic ring" denotes fully aromatic rings in which at least one ring atom is not carbon and can contain 1 to 4 heteroatoms independently selected from the group consisting of nitrogen, oxygen and sulfur, provided that each heteroaromatic ring contains no more than 4 nitrogens, no more than 2 oxygens and no more than 2 sulfurs (where aromatic indicates that the Hückel rule is satisfied). The heteroaromatic ring can be attached through any available carbon or nitrogen by replacement of hydrogen on said carbon or nitrogen.

The term "halogen", either alone or in compound words such as "haloalkyl", includes fluorine, chlorine, bromine or iodine. Further, when used in compound words such as "haloalkyl", said alkyl may be partially or fully substituted with halogen atoms which may

be the same or different. Examples of "haloalkyl" include F_3C, $ClCH_2$, CF_3CH_2 and CF_3CCl_2. The terms "haloalkenyl", "haloalkynyl", "haloalkoxy", and the like, are defined analogously to the term "haloalkyl". Examples of "haloalkenyl" include $(Cl)_2C=CHCH_2$ and $CF_3CH_2CH=CHCH_2$. Examples of "haloalkynyl" include $HC\equiv CCHCl$, $CF_3C\equiv C$, $CCl_3C\equiv C$ and $FCH_2C\equiv CCH_2$. Examples of "haloalkoxy" include CF_3O, CCl_3CH_2O, $HCF_2CH_2CH_2O$ and CF_3CH_2O.

The total number of carbon atoms in a substituent group is indicated by the "C_i-C_j" prefix where i and j are numbers from 1 to 6. For example, C_1-C_3 alkylsulfonyl designates methylsulfonyl through propylsulfonyl; C_2 alkoxyalkyl designates CH_3OCH_2; C_3 alkoxyalkyl designates, for example, $CH_3CH(OCH_3)$, $CH_3OCH_2CH_2$ or $CH_3CH_2OCH_2$; and C_4 alkoxyalkyl designates the various isomers of an alkyl group substituted with an alkoxy group containing a total of four carbon atoms, examples including $CH_3CH_2CH_2OCH_2$ and $CH_3CH_2OCH_2CH_2$. In the above recitations, when a compound of Formula 1 contains a heteroaromatic ring, all substituents are attached to this ring through any available carbon or nitrogen by replacement of a hydrogen on said carbon or nitrogen.

When a group contains a substituent which can be hydrogen, for example R^3, then, when this substituent is taken as hydrogen, it is recognized that this is equivalent to said group being unsubstituted.

Compounds of this invention can exist as one or more stereoisomers. The various stereoisomers include enantiomers, diastereomers, atropisomers and geometric isomers. One skilled in the art will appreciate that one stereoisomer may be more active and/or may exhibit beneficial effects when enriched relative to the other stereoisomer(s) or when separated from the other stereoisomer(s). Additionally, the skilled artisan knows how to separate, enrich, and/or to selectively prepare said stereoisomers. Accordingly, the compounds of the invention may be present as a mixture of stereoisomers, individual stereoisomers, or as an optically active form.

The present invention comprises compounds selected from Formula I, *N*-oxides and agriculturally suitable salts thereof, compositions thereof and methods of their use for invertebrate pest control. One skilled in the art will appreciate that not all nitrogen containing heterocycles can form *N*-oxides since the nitrogen requires an available lone pair for oxidation to the oxide; one skilled in the art will recognize those nitrogen containing heterocycles which can form *N*-oxides. One skilled in the art will also recognize that tertiary amines can form *N*-oxides. Synthetic methods for the preparation of *N*-oxides of heterocycles and tertiary amines are very well known by one skilled in the art including the oxidation of heterocycles and tertiary amines with peroxy acids such as peracetic and *m*-chloroperbenzoic acid (MCPBA), hydrogen peroxide, alkyl hydroperoxides such as *t*-butyl hydroperoxide, sodium perborate, and dioxiranes such as dimethydioxirane. These methods for the preparation of *N*-oxides have been extensively described and reviewed in the

literature, see for example: T. L. Gilchrist in *Comprehensive Organic Synthesis*, vol. 7, pp 748-750, S. V. Ley, Ed., Pergamon Press; M. Tisler and B. Stanovnik in *Comprehensive Heterocyclic Chemistry*, vol. 3, pp 18-19, A. J. Boulton and A. McKillop, Eds., Pergamon Press; M. R. Grimmett and B. R. T. Keene in *Advances in Heterocyclic Chemistry*, vol. 43, pp 139-151, A. R. Katritzky, Ed., Academic Press; M. Tisler and B. Stanovnik in *Advances in Heterocyclic Chemistry*, vol. 9, pp 285-291, A. R. Katritzky and A. J. Boulton, Eds., Academic Press; and G. W. H. Cheeseman and E. S. G. Werstiuk in *Advances in Heterocyclic Chemistry*, vol. 22, pp 390-392, A. R. Katritzky and A. J. Boulton, Eds., Academic Press.

The salts of the compounds of the invention include acid-addition salts with inorganic or organic acids such as hydrobromic, hydrochloric, nitric, phosphoric, sulfuric, acetic, butyric, fumaric, lactic, maleic, malonic, oxalic, propionic, salicylic, tartaric, 4-toluenesulfonic or valeric acids.

Preferred methods for reasons of better activity, cost and/or ease of synthesis are:

Preferred 1. Methods wherein for the compounds of Formula I B is O and R^3 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl or C_3-C_6 cycloalkyl each optionally substituted with one or more substituents selected from the group consisting of halogen, CN, C_1-C_2 alkoxy, C_1-C_2 alkylthio, C_1-C_2 alkylsulfinyl and C_1-C_2 alkylsulfonyl.

Preferred 2. Methods of Preferred 1 wherein J is a phenyl group substituted with 1 to 4 R^5.

Preferred 3. Methods of Preferred 2 wherein

n is 1 to 2;

one R^4 group is attached to the K-ring at the 2-position or 5-position, and said R^4 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl or C_1-C_4 haloalkylsulfonyl; and

each R^5 is independently H, halogen, C_1-C_4 alkyl, C_1-C_2 alkoxy, C_1-C_4 haloalkyl, CN, NO_2, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl or C_2-C_4 alkoxycarbonyl; or

each R^5 is independently a phenyl or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with R^6; or

$(R^5)_2$ when attached to adjacent carbon atoms can be taken together as $-OCF_2O-$, $-CF_2CF_2O-$ or $-OCF_2CF_2O-$.

Preferred 4. Methods of Preferred 3 wherein

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3 or $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

each R^5 is independently H, halogen, methyl, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, OCH_2CF_3, OCF_2CHF_2, $S(O)_pCH_2CF_3$ or $S(O)_pCF_2CHF_2$; or a phenyl, pyrazole, imidazole, triazole, pyridine or pyrimidine ring, each ring optionally substituted with C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN; and

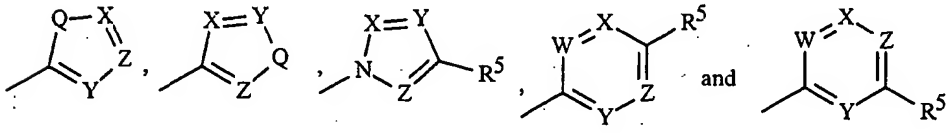
p is 0, 1 or 2.

Preferred 5. Methods of Preferred 4 wherein R^3 is *i*-propyl or *t*-butyl.

Preferred 6. Methods of Preferred 1 wherein J is a 5- or 6-membered heteroaromatic ring optionally substituted with 1 to 4 R^5.

Preferred 7. Methods of Preferred 6 wherein

J is a 5- or 6-membered heteroaromatic ring selected from the group consisting of J-1, J-2, J-3, J-4 and J-5, each J optionally substituted with 1 to 3 R^5



J-1 J-2 J-3 J-4 J-5

;

Q is O, S or NR^5; and

W, X, Y and Z are independently N or CR^5, provided that in J-4 and J-5 at least one of W, X, Y or Z is N.

Preferred 8. Methods of Preferred 7 wherein

n is 1 to 2;

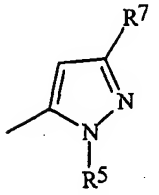
one R^4 group is attached to the K-ring at the 2-position or 5-position, and said R^4 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, or C_1-C_4 haloalkylsulfonyl; and

each R^5 is independently H, C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl or C_2-C_4 alkoxycarbonyl; or a phenyl or a 5- or

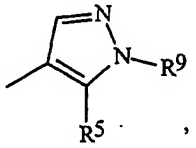
6-membered heteroaromatic ring, each ring optionally substituted with R^6.

Preferred 9. Methods of Preferred 8 wherein

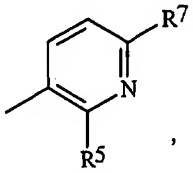
J substituted with 1 to 3 R^5 is selected from the group consisting of J-6, J-7, J-8, J-9, J-10, J-11, J-12 and J-13



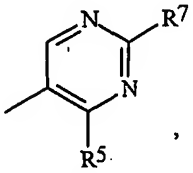
J-6



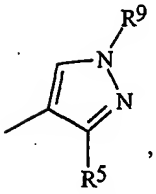
J-7



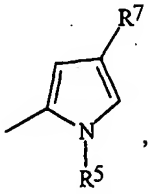
J-8



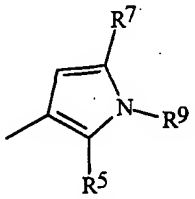
J-9



J-10

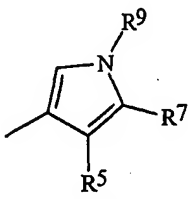


J-11



J-12

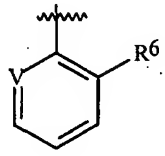
and



J-13

;

R^5 is



;

V is N, CH, CF, CCl, CBr or CI;

each R^7 is independently H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, halogen, CN, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy or C_1-C_4 haloalkylthio;

R^9 is H, C_2-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_6 alkenyl, C_3-C_6 haloalkenyl, C_3-C_6 alkynyl or C_3-C_6 haloalkynyl, provided that R^7 and R^9 are not both H; and

n is 0, 1 or 2.

Preferred 10. Methods of Preferred 9 wherein

J substituted with 1 to 3 R^5 is J-6;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and
p is 0, 1 or 2.

Preferred 11. Methods of Preferred 10 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

Preferred 12. Methods of Preferred 9 wherein
J substituted with 1 to 3 R^5 is J-7;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1or 2.

Preferred 13. Methods of Preferred 12 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Preferred 14. Methods of Preferred 9 wherein
J substituted with 1 to 3 R^5 is J-8;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN R^6 is CH_3, CF_3 or halogen;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

Preferred 15. Methods of Preferred 14 wherein

R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

Preferred 16. Methods of Preferred 9 wherein
J substituted with 1 to 3 R^5 is J-9;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

Preferred 17. Methods of Preferred 18 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is CF_3.

Preferred 18. Methods of Preferred 9 wherein
J substituted with 1 to 3 R^5 is J-10;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1or 2.

Preferred 19. Methods of Preferred 18 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Preferred 20. Methods of Preferred 9 wherein

J substituted with 1 to 3 R^5 is J-11;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and

p is 0, 1 or 2.

Preferred 21. Methods of Preferred 20 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^7 is halogen or CF_3.

Preferred 22. Methods of Preferred 9 wherein

J substituted with 1 to 3 R^5 is J-12;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and

p is 0, 1or 2.

Preferred 23. Methods of Preferred 22 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Preferred 24. Methods of Preferred 9 wherein

J substituted with 1 to 3 R^5 is J-13;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and

p is 0, 1or 2.

Preferred 25. Methods of Preferred 24 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Most preferred is the method wherein the compound of Formula I is selected from the group consisting of:

8-methyl-3-(1-methylethyl)-2-[2-methyl-6-(trifluoromethyl)-3-pyridinyl]-4(3*H*)-quinazolinone,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3,8-dimethyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-ethyl-8-methyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-methyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-ethyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-(1-methylethyl)-4(3*H*)-quinazoline,
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline, and
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline.

Preferred compounds for reasons of better activity, cost and/or ease of synthesis are:

Preferred A. Compounds of Formula Ia wherein

J substituted with 1 to 3 R^5 is J-6;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and

p is 0, 1 or 2.

Preferred B. Compounds of Preferred A wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

Preferred C. Compounds of Formula Ia wherein
J substituted with 1 to 3 R^5 is J-7;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1or 2.

Preferred D. Compounds of Preferred C wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Preferred E. Compounds of Formula Ia wherein
J substituted with 1 to 3 R^5 is J-8;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN R^6 is CH_3, CF_3 or halogen;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

Preferred F. Methods of Preferred E wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

Preferred G. Compounds of Formula Ia wherein

J substituted with 1 to 3 R^5 is J-9;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^7 is CH_3, CF_3 or halogen; and

p is 0, 1 or 2.

Preferred H. Compounds of Preferred G wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^7 is CF_3.

Preferred I. Compounds of Formula Ia wherein

J substituted with 1 to 3 R^5 is J-10;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and

p is 0, 1or 2.

Preferred J. Compounds of Preferred I wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Preferred K. Compounds of Formula Ia wherein

J substituted with 1 to 3 R^5 is J-11;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and
p is 0, 1 or 2.

Preferred L. Compounds of Preferred K wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

Preferred M. Compounds of Formula Ia wherein
J substituted with 1 to 3 R^5 is J-12;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1or 2.

Preferred N. Methods of Preferred M wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Preferred O. Compounds of Formula Ia wherein
J substituted with 1 to 3 R^5 is J-13;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1or 2.

Preferred P. Methods of Preferred O wherein
R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

Most preferred is the compound of Formula I selected from the group consisting of:

8-methyl-3-(1-methylethyl)-2-[2-methyl-6-(trifluoromethyl)-3-pyridinyl]-4(3*H*)-quinazolinone,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3,8-dimethyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-ethyl-8-methyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

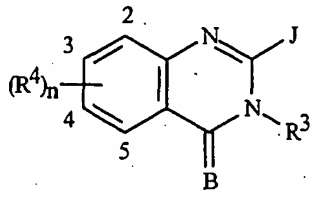
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,

2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-methyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-ethyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-(1-methylethyl)-4(3*H*)-quinazoline,
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline, and
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline.

This invention also pertains to a composition for controlling an invertebrate pest comprising a biologically effective amount of a compound of Formula Ia and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents. Preferred compositions are those comprising the above preferred compounds.

Of note is a method for controlling arthropods comprising contacting the arthropods or their environment with an arthropodicidally effective amount of a compound of Formula 1, its *N*-oxides or agriculturally suitable salts thereof



1

wherein

B is O or S;

J is a phenyl group substituted with 1 to 2 R^5 and optionally substituted with 1 to 3 R^6, or a 5- or 6-membered heteroaromatic ring optionally substituted with 1 to 4 R^7;

n is 1 to 4;

R^3 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, each optionally substituted with one or more substituents selected from the group consisting of halogen, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl and C_1-C_4 alkylsulfonyl; C_1-C_4 alkoxy; C_1-C_4 alkylamino; C_2-C_8 dialkylamino; C_3-C_6 cycloalkylamino; C_2-C_6 alkoxycarbonyl or C_2-C_6 alkylcarbonyl;

each R^4 is independently H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, CO_2H, $CONH_2$, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_2-C_6 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl, C_3-C_6 trialkylsilyl; or

each R^4 is independently phenyl, benzyl or phenoxy, each optionally substituted with C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl;

each R^5 is independently C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, CO_2H, $CONH_2$, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_2-C_6 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl, C_3-C_6 trialkylsilyl; or

$(R^5)_2$ when attached to adjacent carbon atoms can be taken together as $-OCF_2O-$, $-CF_2CF_2O-$, or $-OCF_2CF_2O-$;

each R^6 is independently H, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 alkoxy or C_2-C_4 alkoxy carbonyl; or

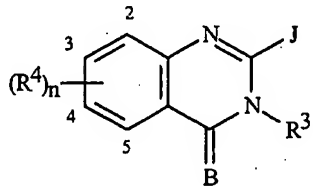
each R^6 is independently a phenyl, benzyl, phenoxy or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with C_1-C_4 alkyl, C_2-C_4

alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl;

each R^7 is independently H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, CO_2H, $CONH_2$, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkoxycarbonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_2-C_6 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl, C_3-C_6 trialkylsilyl; or

each R^7 is independently a phenyl, benzyl, benzoyl, phenoxy or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl.

Of note are compounds of Formula 1 wherein



1

B is O;

J is a phenyl group substituted with 1 to 2 R^5 and optionally substituted with 1 to 3 R^6; or J is selected from the group consisting of pyridine, pyrimidine, pyrazole, thiophene and thiazole, each optionally substituted with 1 to 3 R^7;

R^3 is C_2-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

each R^4 is independently CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$ or halogen;

each R^5 is independently CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, OCH_2CF_3, OCF_2CHF_2, $S(O)_pCH_2CF_3$ or $S(O)_pCF_2CHF_2$;

each R^6 is independently halogen or methyl; or phenyl, pyrazole, imidazole, triazole, pyridine or pyrimidine, each ring optionally substituted with C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

each R^7 is independently H, halogen, CH_3, CF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, OCH_2CF_3, OCF_2CHF_2, $S(O)_pCH_2CF_3$, $S(O)_pCF_2CHF_2$; or phenyl, pyrazole, imidazole, triazole, pyridine or pyrimidine, each ring optionally substituted with C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, halogen, NO_2 or CN; and

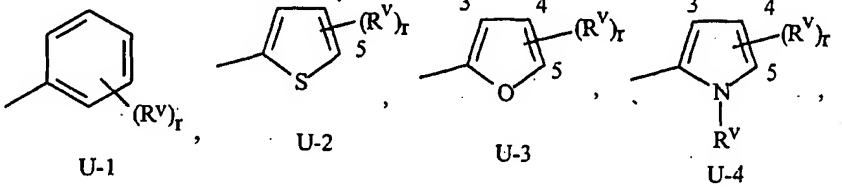
p is 0, 1 or 2.

As noted above, J is a phenyl ring, a naphthyl ring system, a 5- or 6-membered heteroaromatic ring or an aromatic 8-, 9- or 10-membered fused heterobicyclic ring system wherein each ring or ring system is optionally substituted with 1 to 4 R^5. The term "optionally substituted" in connection with these J groups refers to groups which are unsubstituted or have at least one non-hydrogen substituent that does not extinguish the biological activity possessed by the unsubstituted analog. An example of phenyl optionally substituted with 1 to 4 R^5 is the ring illustrated as U-1 in Exhibit 1, wherein R^v is R^5 and r is an integer from 1 to 4. An example of a naphthyl group optionally substituted with 1 to 3 R^5 is illustrated as U-85 in Exhibit 1, wherein R^v is R^5 and r is an integer from 1 to 4. Examples of 5- or 6-membered heteroaromatic rings optionally substituted with 1 to 4 R^5 include the rings U-2 through U-53 illustrated in Exhibit 1 wherein R^v is R^5 and r is an integer from 1 to 4. Note that J-1 through J-5 below also denote 5- or 6-membered heteroaromatic rings. Note that U-2 through U-20 are examples of J-1, U-21 through U-35 and U-40 are examples of J-2, U-36 through U-39 are examples of J-3, U-41 through U-48 are examples of J-4 and U-49 through U-53 are examples of J-5. Examples of aromatic 8-, 9- or 10-membered fused heterobicyclic ring systems optionally substituted with 1 to 4 R^5 include U-54 through U-84 illustrated in Exhibit 1 wherein R^v is R^5 and r is an integer from 1 to 4.

Although R^v groups are shown in the structures U-1 through U-85, it is noted that they do not need to be present since they are optional substituents. Note that when R^v is H when attached to an atom, this is the same as if said atom is unsubstituted. The nitrogen atoms that require substitution to fill their valence are substituted with H or R^v. Note that some U groups can only be substituted with less than 4 R^v groups (e.g. U-14, U-15, U-18 through U-21 and U-32 through U-34 can only be substituted with one R^v). Note that when the attachment point between $(R^v)_r$ and the U group is illustrated as floating, $(R^v)_r$ can be attached to any available carbon atom of the U group. Note that when the attachment point

on the U group is illustrated as floating, the U group can be attached to the remainder of Formula I through any available carbon of the U group by replacement of a hydrogen atom.

Exhibit 1

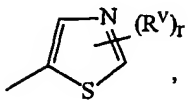


U-1

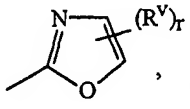
U-2

U-3

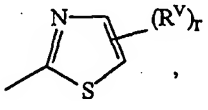
U-4



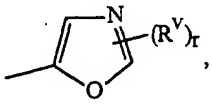
U-5



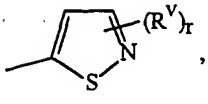
U-6



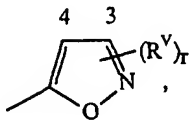
U-7



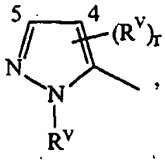
U-8



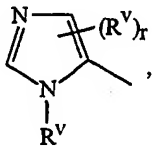
U-9



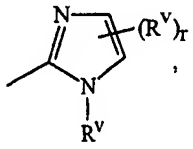
U-10



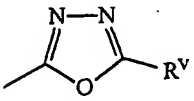
U-11



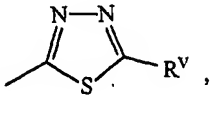
U-12



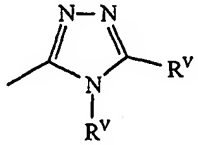
U-13



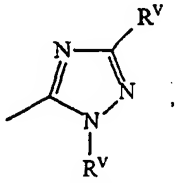
U-14



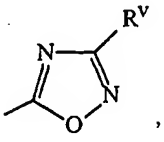
U-15



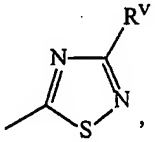
U-16



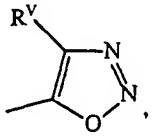
U-17



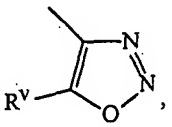
U-18



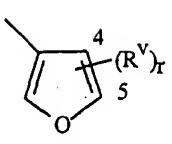
U-19



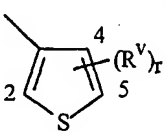
U-20



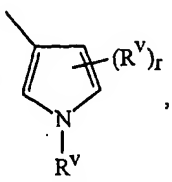
U-21



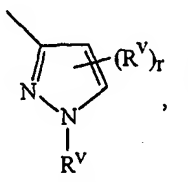
U-22



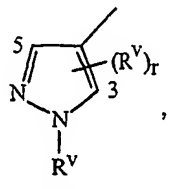
U-23



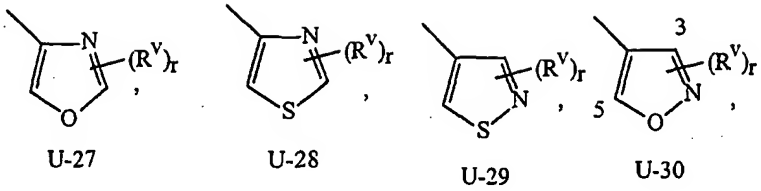
U-24



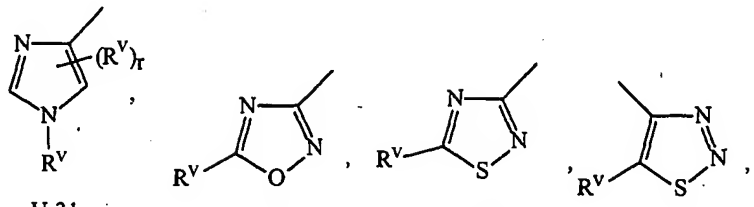
U-25



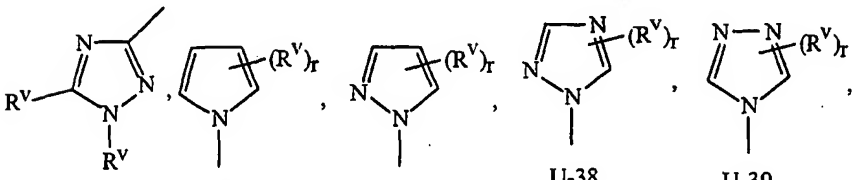
U-26



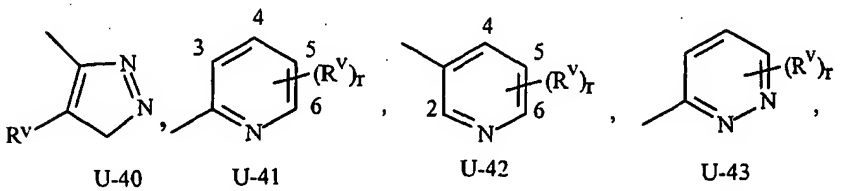
U-27 U-28 U-29 U-30



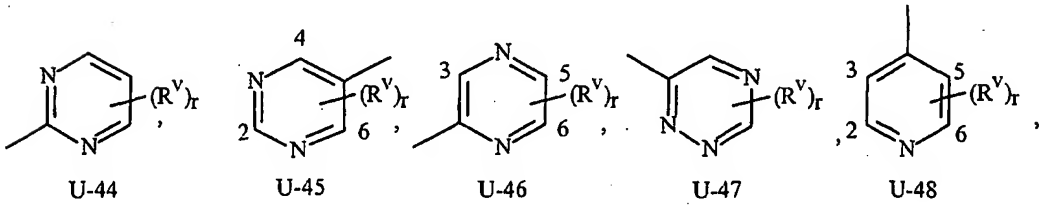
U-31 U-32 U-33 U-34



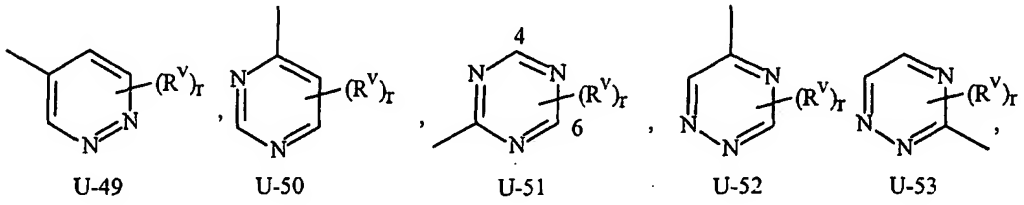
U-35 U-36 U-37 U-38 U-39



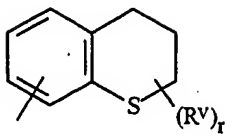
U-40 U-41 U-42 U-43



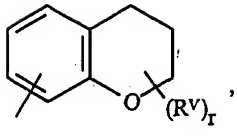
U-44 U-45 U-46 U-47 U-48



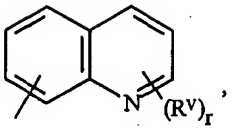
U-49 U-50 U-51 U-52 U-53



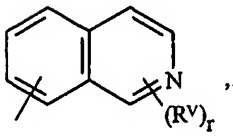
U-54



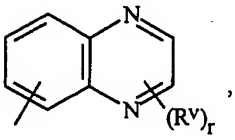
U-55



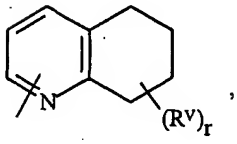
U-56



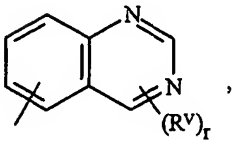
U-57



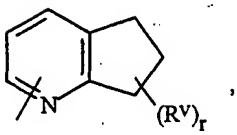
U-58



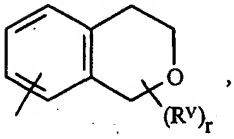
U-59



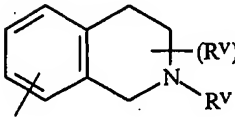
U-60



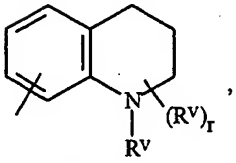
U-61



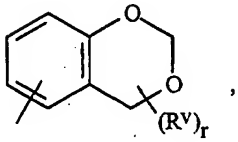
U-62



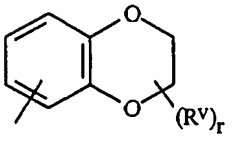
U-63



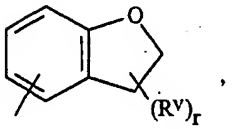
U-64



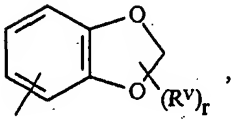
U-65



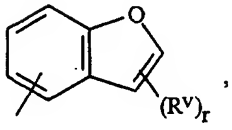
U-66



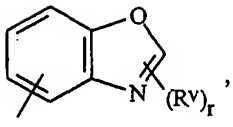
U-67



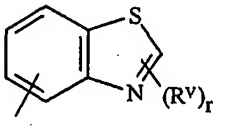
U-68



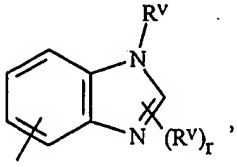
U-69



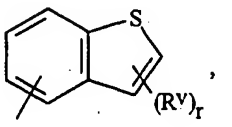
U-70



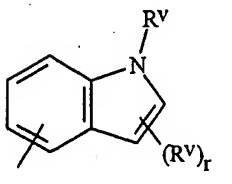
U-71



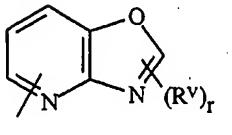
U-72



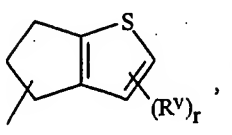
U-73



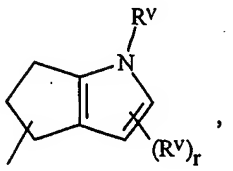
U-74



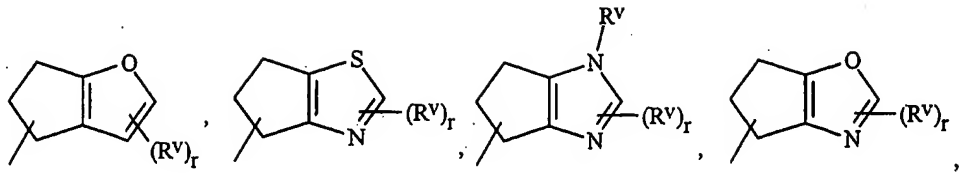
U-75



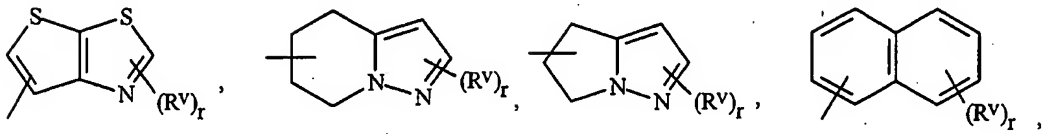
U-76



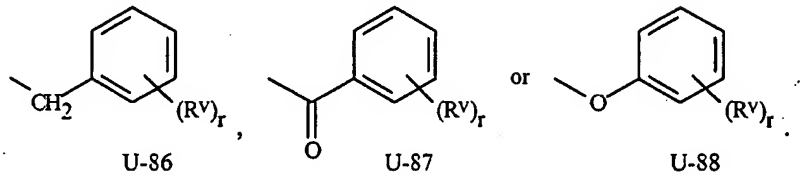
U-77



U-78 U-79 U-80 U-81



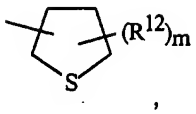
U-82 U-83 U-84 U-85

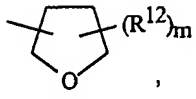


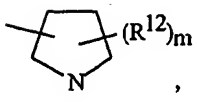
U-86 U-87 U-88

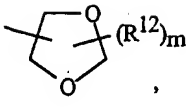
As noted above G can be a 5- or 6-membered nonaromatic carbocyclic or heterocyclic ring, optionally including one or two ring members selected from the group consisting of C(=O), SO or $S(O)_2$ and optionally substituted with 1 to 4 substituents selected from R^{12}. Examples of such G groups include those illustrated as G-1 through G-41 in Exhibit 2 wherein m is an integer from 1 to 4. The term "optionally substituted" in connection with these G groups refers to groups which are unsubstituted or have at least one non-hydrogen substituent that does not extinguish the biological activity possessed by the unsubstituted analog. Although $(R^{12})_m$ are illustrated in the examples, they need not be present since they are optional substituents. Note that when the attachment point on these G groups is illustrated as floating, the G group can be attached to the remainder of Formula I through any available carbon or nitrogen of the G group by replacement of a hydrogen atom. The optional substituents can be attached to any available carbon or nitrogen by replacing a hydrogen atom. Note that when G comprises a ring selected from G-24 through G-29 and G-32 through G-35, A is selected from O, S, NH or NR^{12}. Note that when G is G-3, G-5, G-7, G-9, G-16 through G-18, G-23, and G-24 through G-29, and G-32 through G-35 (when A is NR^{12}), the nitrogen atoms that require substitution to fill their valence are substituted with H or R^{12}.

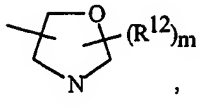
Exhibit 2

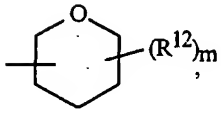

G-1

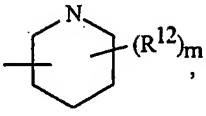

G-2

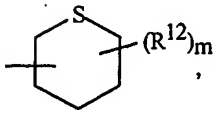

G-3

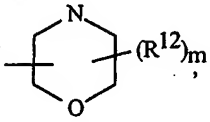

G-4

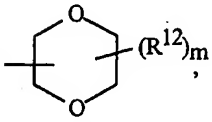

G-5

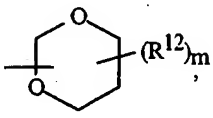

G-6

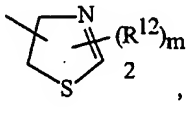

G-7

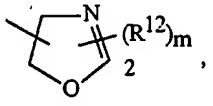

G-8

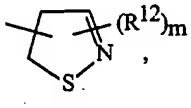

G-9

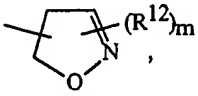

G-10

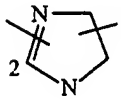

G-11

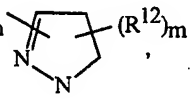

G-12

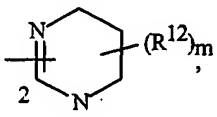

G-13

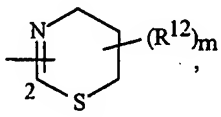

G-14

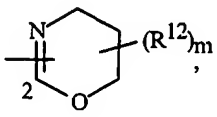

G-15

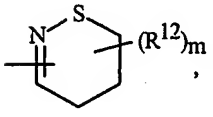

G-16

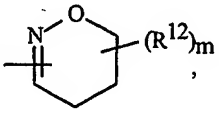

G-17

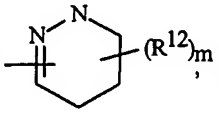

G-18

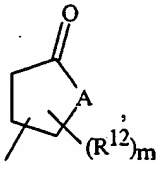

G-19

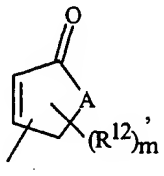

G-20

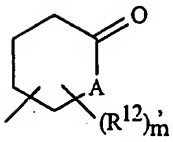

G-21

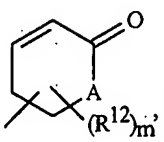

G-22

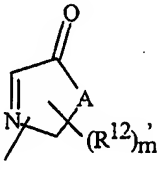

G-23

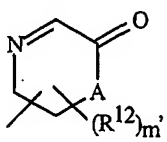

G-24

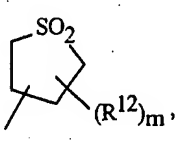

G-25

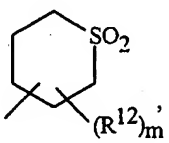

G-26

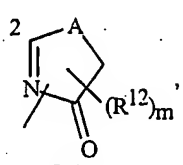

G-27

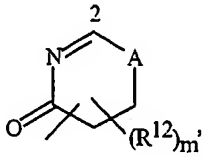

G-28

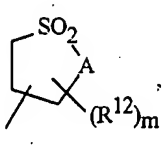

G-29

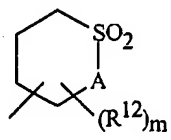

G-30

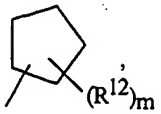

G-31

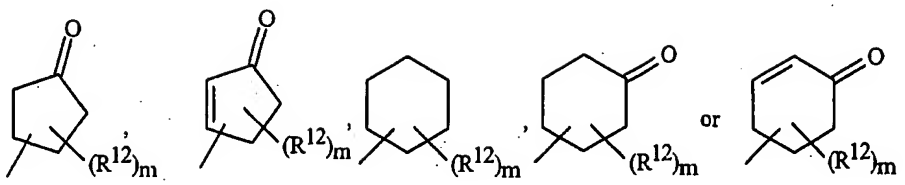

G-32


G-33


G-34


G-35


G-36



G-37 G-38 G-39 G-40 G-41

As noted above, R^3 can be (among others) C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, each optionally substituted with one or more substituents selected from (among others) a phenyl, phenoxy or 5- or 6-membered heteroaromatic ring, each ring optionally substituted with one to three substituents independently selected from R^6. The term "optionally substituted" in connection with these groups refers to groups which are unsubstituted or have at least one non-hydrogen substituent that does not extinguish the biological activity possessed by the unsubstituted analog. Examples of such substituents include the rings illustrated as U-1 through U-53 and U-88 illustrated in Exhibit 1, except that such rings are optionally substituted with 1 to 3 substituents independently selected from R^6 rather than $(R^v)_r$. Note that R^6 substituents do not need to be present since they are optional substituents.

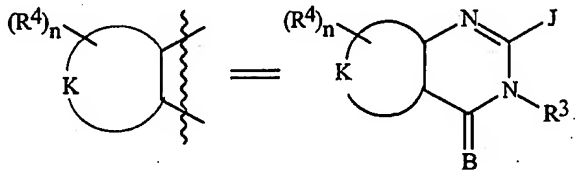
As noted above, each R^4 is independently (among others) a phenyl, benzyl, phenoxy or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with one to three substituents independently selected from R^6. The term "optionally substituted" in connection with these R^4 groups refers to groups which are unsubstituted or have at least one non-hydrogen substituent that does not extinguish the biological activity possessed by the unsubstituted analog. Examples of such R^4 groups include the rings illustrated as U-1 through U-53, U-86 and U-88 illustrated in Exhibit 1, except that such rings are optionally substituted with 1 to 3 substituents independently selected from R^6 rather than $(R^v)_r$. Note that R^6 substituents do not need to be present since they are optional substituents.

As noted above, each R^5 is independently (among others) a phenyl, benzyl, benzoyl, phenoxy, 5- or 6-membered heteroaromatic ring or an aromatic 8-, 9- or 10-membered fused heterobicyclic ring system, each ring optionally substituted with one to three substituents independently selected from R^6. Examples of such R^5 groups include the rings illustrated as U-1 through U-88 illustrated in Exhibit 1, except that such rings are optionally substituted with 1 to 3 substituents independently selected from R^6 rather than $(R^v)_r$. Note that R^6 substituents do not need to be present since they are optional substituents. Note that in J-6 through J-13, R^7 and R^9 are subsets of R^5.

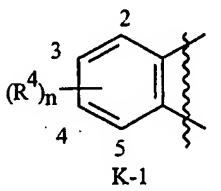
As noted above K is, together with the two contiguous linking carbon atoms, a fused phenyl or a fused pyridinyl ring optionally substituted with 1 to 4 R^4. The term "optionally substituted" in connection with these K groups refers to groups which are unsubstituted or have at least one non-hydrogen substituent that does not extinguish the biological activity

possessed by the unsubstituted analog. Examples of such K groups include the rings illustrated as K-1 through K-5 in Exhibit 3. Note that K-2 through K-5 can be optionally substituted with one to three 3 R^4 groups. In the exemplified K groups, the upper right bond is attached through the available linking carbon atom to the nitrogen atom of the N=C-J portion of Formula I and the lower right bond is attached through the available linking carbon atom to the carbon atom of the C(=B)NR^3 portion of Formula I. The wavy line indicates that the K-ring is attached to the remainder of Formula I as illustrated below.

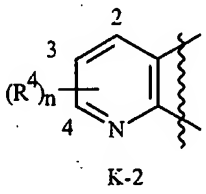
Exhibit 3



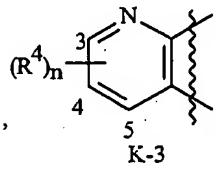
1



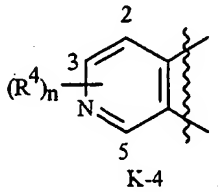
K-1



K-2

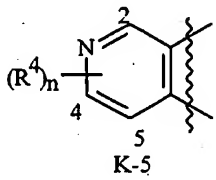


K-3



K-4

or



K-5

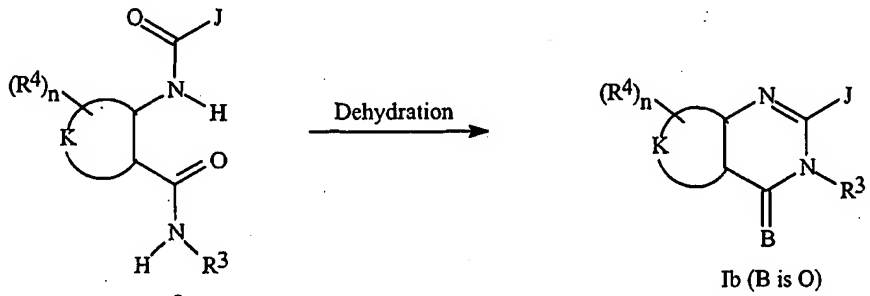
Preferred K-rings are K-1, K-2 and K-5. Most preferred is K-1.

The compounds of Formula I can be prepared by one or more of the following methods and variations as described in Schemes 1-13. The definitions of B, J, K, R^3, R^4, R^5 and n in the compounds of Formulae I and 2-24 below are as defined above in the Summary of the Invention. Of note are compounds wherein K is K-1.

Compounds of Formula Ib (Formula I wherein B is O) can be prepared by procedures outlined in Schemes 1-13. A typical procedure is detailed in Scheme 1 and involves dehydration of an *o*-amido amide of Formula 2 with sodium hydride and ethyl chloroformate in a suitable solvent (See e.g. Example 1). Other methods for preparing compounds of Formula I include treating a compound of Formula 2 with acetic anhydride and sodium acetate, heating at greater than 70 °C neat or optionally in an appropriate solvent such as tetrahydrofuran, and treating 2 with a suitable acid scavenger and trimethylsilyl chloride in a

suitable solvent. Further useful methods include heating *o*-amido amides of Formula 2 adsorbed on surface-active materials such as zeolites or clay, generally in the range of 50-150 °C. A specific example of this type is described in Example 2 and involves heating the anthranilic amide on Montmorillonite clay. Compounds of Formula Ic (Formula I wherein B is S) can be prepared by conventional methods for conversion of amides to thioamides such as by treatment with phosphorus pentasulfide or Lawesson's reagent. (See (Bull. Soc. Chim. *Belg.*), **1978**, 87, 229; and (*Tetrahedron Lett.*), **1983**, 24, 3815 for general procedures).

Scheme 1

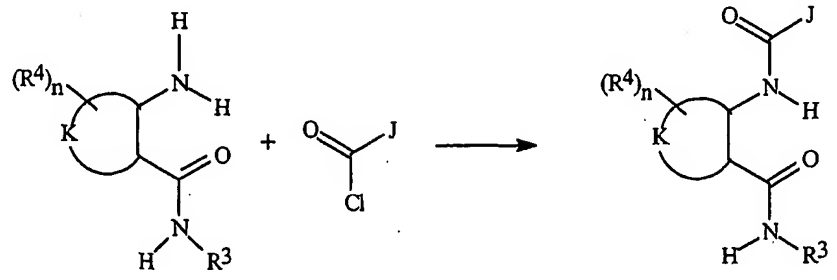


2

Ib (B is O)
Ic (B is S)

Compounds of Formula 2 can be prepared by procedures outlined in Scheme 2. A typical procedure involves coupling of an *o*-amino amide of Formula 3 with an acid chloride of Formula 4 in the presence of an acid scavenger to provide the compound of Formula 2. Typical acid scavengers include amine bases such as triethylamine, diisopropylethylamine and pyridine; other scavengers include hydroxides such as sodium and potassium hydroxide and carbonates such as sodium carbonate and potassium carbonate. In certain instances it is useful to use polymer-supported acid scavengers such as polymer-bound diisopropylethylamine and polymer-bound dimethylaminopyridine.

Scheme 2

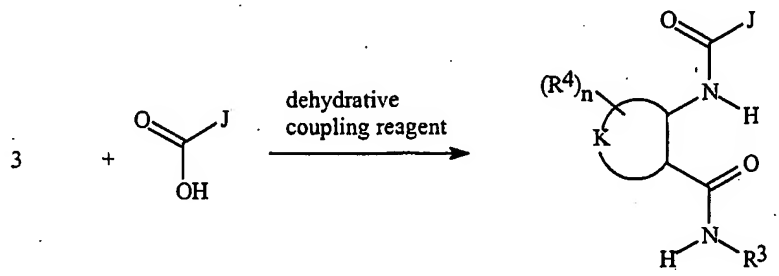


3 4 2

An alternate procedure for the preparation of compounds of Formula 2 involves coupling of an *o*-amino amide of Formula 3 with an acid of Formula 5 in the presence of a

dehydrating agent such as dicyclohexylcarbodiimide (DCC). Polymer supported reagents can be useful here, such as polymer-bound cyclohexylcarbodiimide. Synthetic procedures of Schemes 2 and 3 are only representative examples of useful methods for the preparation of Formula 2 compounds as the synthetic literature is extensive for this type of reaction.

Scheme 3

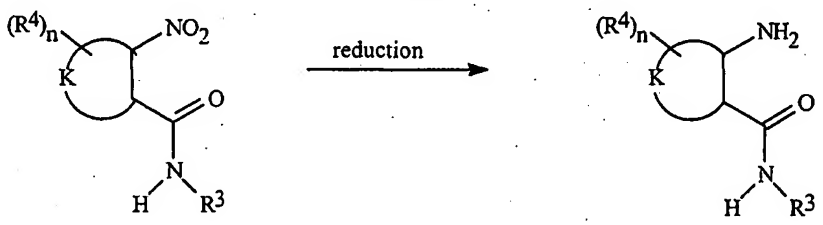


5 2

One skilled in the art will also realize that acid chlorides of Formula 4 may be prepared from acids of Formula 5 by numerous well-known methods.

Formula 3 *o*-Amino amides are typically available from the corresponding *o*-nitro amides of Formula 6 via catalytic hydrogenation of the nitro group. Typical procedures involve reduction with hydrogen in the presence of a metal catalyst such as palladium on carbon or platinum oxide and in hydroxylic solvents such as ethanol and isopropanol. These procedures are well documented in the chemical literature.

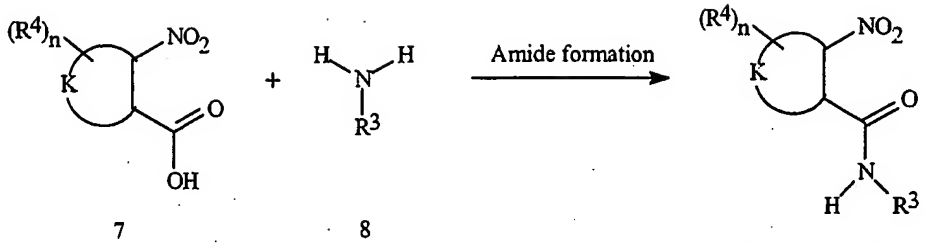
Scheme 4



6 3

The intermediate amides of Formula 6 are readily prepared from commercially available *o*-nitro acids of Formula 7. Typical methods for amide formation can be applied here. These include direct dehydrative coupling of acids of Formula 7 with amines of Formula 8 using for example DCC, and conversion of the acids to an activated form such as the acid chlorides or anhydrides and subsequent coupling with amines to form amides of Formula 6. Ethylchloroformate is an especially useful reagent for this type of reaction.

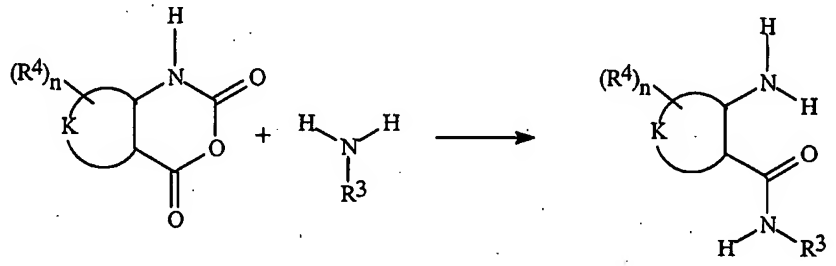
Scheme 5



7 8 6

Intermediate *o*-amino amides of Formula 3 may also be prepared from anhydrides of Formula 9 (Scheme 6). Typical procedures involve combination of equimolar amounts of the amine 8 with the anhydride of Formula 9 in polar aprotic solvents such as pyridine and dimethylformamide at temperatures ranging from room temperature to 100 °C.

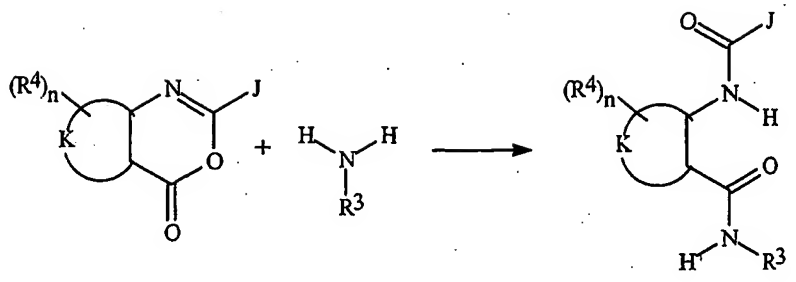
Scheme 6



9 8 3

An alternate procedure for the preparation of compounds of Formula 2 involves reaction of an amine 8 with a compound of Formula 10. Typical procedures involve combination of the amine with the compound of Formula 10 in solvents such as tetrahydrofuran or pyridine at temperatures ranging from room temperature to the reflux temperature of the solvent. Benzoxazinones (compounds of Formula 10 wherein K is K-1) are well documented in the chemical literature and are available via known methods that involve the coupling of either an anthranilic acid or an isatoic anhydride with an acid chloride.

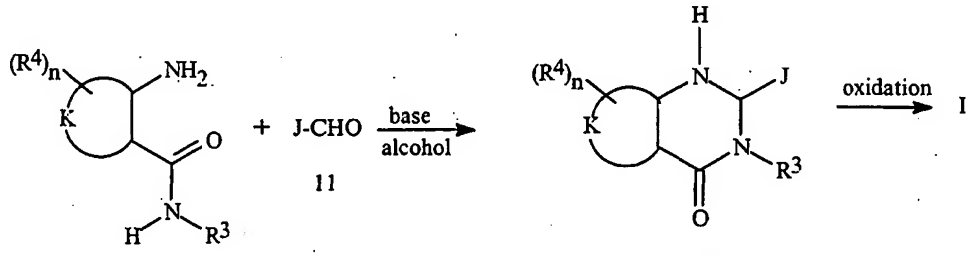
Scheme 7



10 8 2

Compounds of Formula I may also be prepared by modification of known procedures (*J. Med. Chem.* **1985**, *28*, 568). Usually this involves condensation of an aryl aldehyde of Formula 11 with a compound of Formula 3 in an alcoholic solvent and with a catalytic amount of base to produce intermediate 12, which is then further oxidized to the Formula I compound by known methods. This reaction is shown in Scheme 8.

Scheme 8

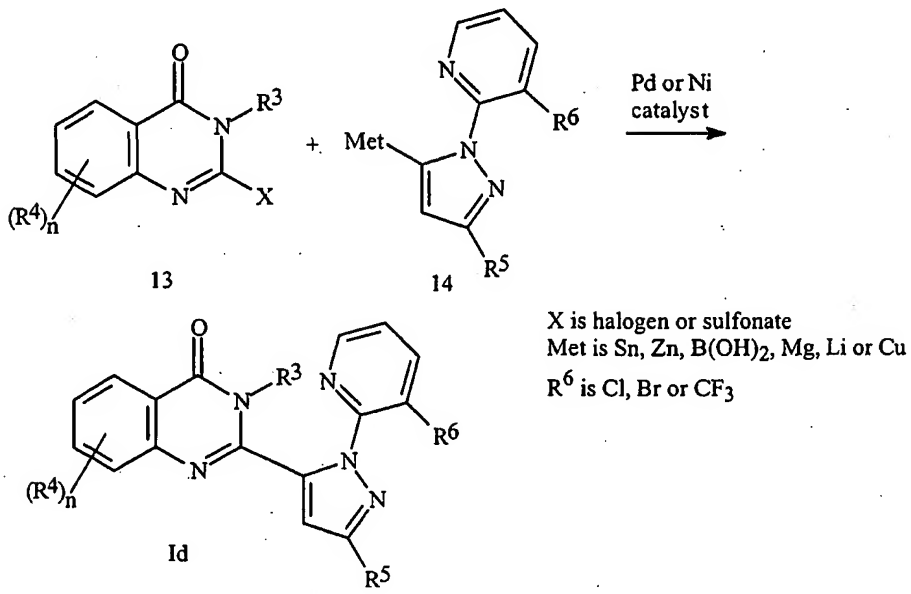


3 11 12

An alternate procedure for the preparation of specific quinazolinones of Formula I (Formula Id) is depicted in Scheme 9. This procedure may be specifically suitable for pyrazole-substituted quinazolinones which may prove difficult to prepare by alternate procedures. The cross coupling reaction of quinazolines of Formula 13 (wherein X is a leaving group such as halogen, triflate or fluorosulfonate) with pyrazoles of Formula 14 (where Met is Sn, Zn, $B(OH)_2$, Mg, Li or Cu and additional counterions as necessary) in the presence of a palladium or nickel catalyst produces compounds of Formula Id. Quinazolines of Formula 13 wherein X is halogen are known in the art (PCT patent application publication WO98/26664 and references cited therein). Preferred catalysts for the synthesis of compounds of Formula Id include but are not limited to $Pd(PPh_3)_4$, $PdCl_2(PPh_3)_2$, $PdCl_2$(diphenylphosphinoferrocene), $NiCl_2(PPh_3)_2$, and Tetrakis(tri-2-furylphosphino)palladium. The exact conditions for each reaction depend upon the catalyst used and the metal attached to the pyrazole. The additional presence of an external base (such as an alkali carbonate, tertiary amine or alkali fluoride) is necessary for reactions

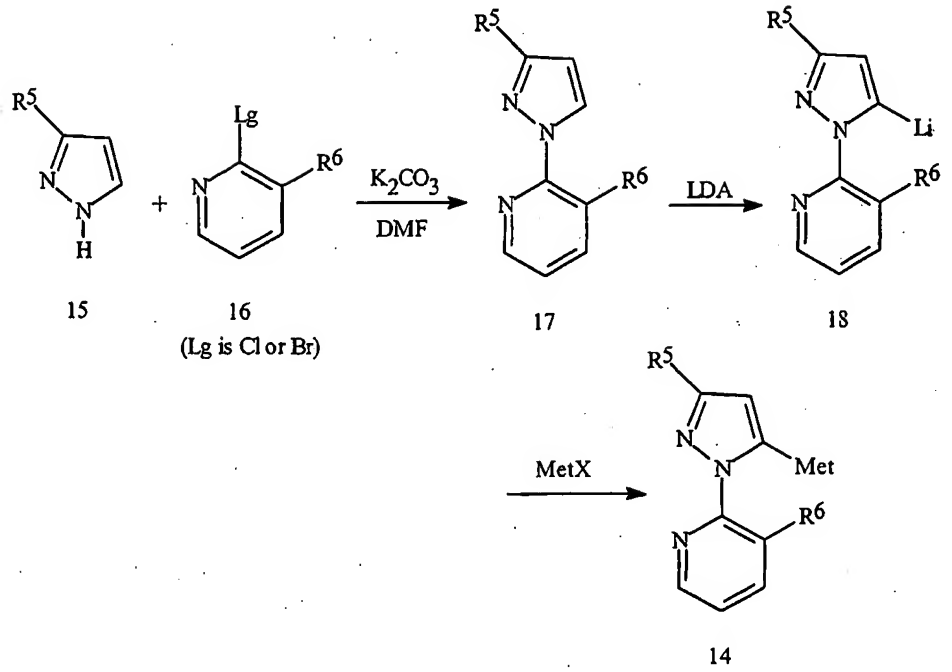
involving pyrazoles of Formula 14 where Met is $B(OH)_2$. Similar procedures also can be used for other K-rings and J-groups.

Scheme 9



Pyrazoles of Formula 14 can be made by lithiation of the pyrazole 17 followed by transmetallation with the appropriate metal as described in Scheme 10. Pyridylpyrazoles 17 are prepared by the reaction of pyrazoles 15 with a 2,3-dihalopyridine of Formula 16 to afford the 1-pyridylpyrazole 17 with good specificity for the desired regiochemistry. Metallation of 17 with lithium diisopropylamide (LDA) followed by transmetallation with the appropriate metal affords the metal pyrazole of Formula 14. For conditions and catalysts used in transmetallation and cross coupling reactions see *Metal-catalyzed Cross-coupling Reactions*. Diederich, Francois; Stang, Peter J.; Editors. **1998**, p. 517, (Wiley-VCH, Weinheim, Germany) and references cited therein.

Scheme 10

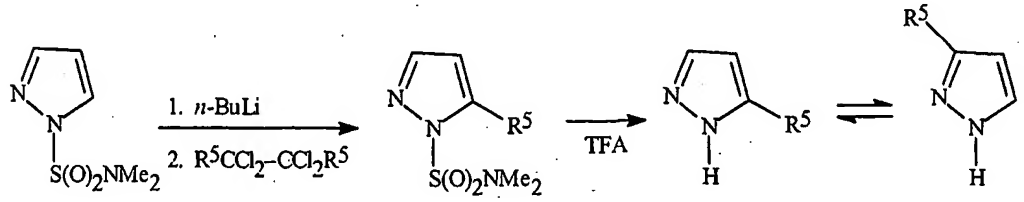


15 16 (Lg is Cl or Br) 17 18

14

The starting pyrazoles 15 are known compounds. Pyrazole 15 wherein R^5 is CF_3 is commercially available. Pyrazoles 15 wherein R^5 is Cl or Br can be prepared by literature procedures (*Chem. Ber.* **1966**, *99*(10), 3350–7). A useful alternative method for the preparation of 15 wherein R^5 is Cl or Br is depicted in Scheme 11. Metallation of the sulfamoyl pyrazole 19 with *n*-butyllithium followed by direct halogenation of the anion with either hexachloroethane (for R^5 being Cl) or 1,2-dibromotetrachloroethane (for R^5 being Br) affords the halogenated derivatives 20. Removal of the sulfamoyl group with trifluoroacetic acid (TFA) at room temperature proceeds cleanly and in good yield to afford the pyrazoles 15 wherein R^5 is Cl or Br respectively. One skilled in the art will recognize that Formula 15c is a tautomer of Formula 15b.

Scheme 11



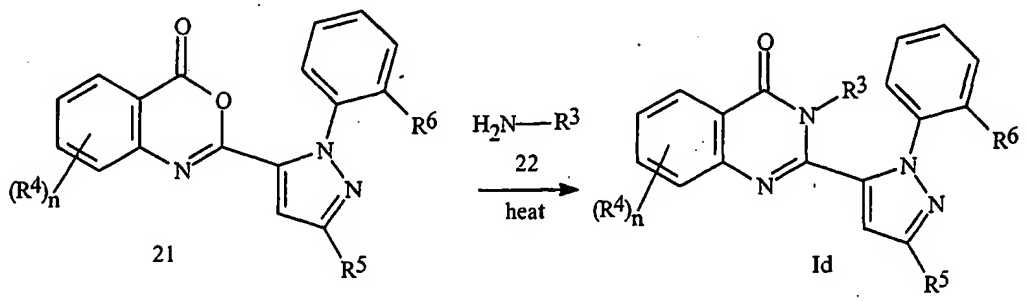
19 20 15b 15c

(R^5 is Cl or Br)

An alternate procedure for the preparation of quinazolinones of Formula Id involves prolonged heating of a benzoxazinone of Formula 21 with an amine of Formula 22 as shown in Scheme 12. Reactions times as long as 1-7 days may be required. An example of this

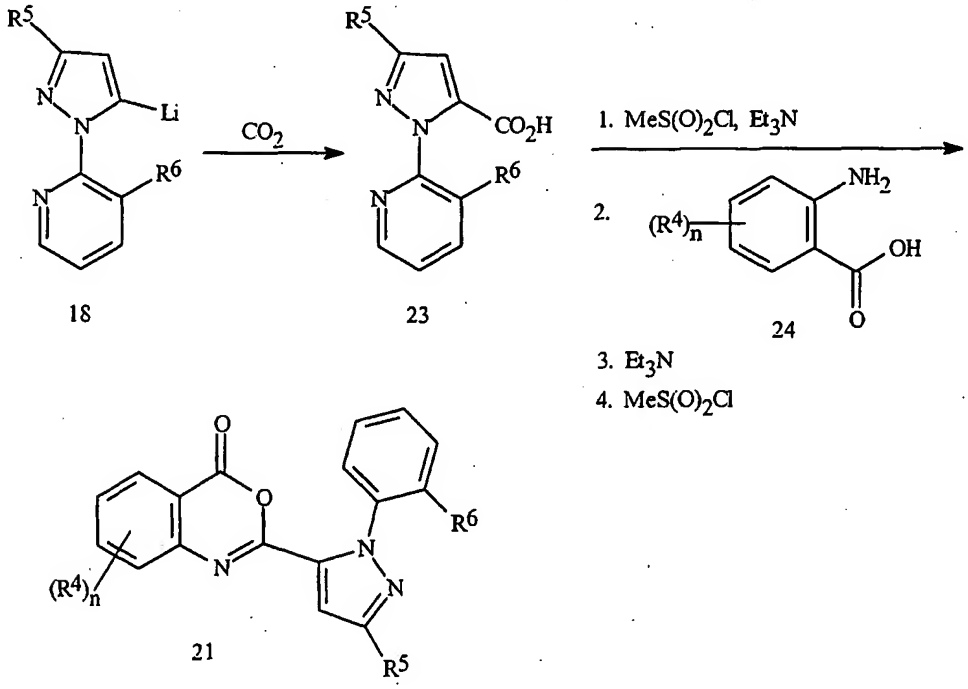
type is detailed in Example 3. Similar procedures also can be used for other K-rings and J-groups.

Scheme 12



The benzoxazinones of Formula 21 are available by the method of Scheme 13. Coupling of a pyrazole acid of Formula 23 with an anthranilic acid of Formula 24 via sequential addition of methanesulfonyl chloride and triethylamine affords the benzoxazinone of Formula 21. The intermediate acid of Formula 23 is available from the lithiated pyrazole 18 by quenching with carbon dioxide. Similar procedures also can be used for other K-rings and J-groups.

Scheme 13



It is recognized that some reagents and reaction conditions described above for preparing compounds of Formula I may not be compatible with certain functionalities present in the intermediates. In these instances, the incorporation of protection/deprotection

sequences or functional group interconversions into the synthesis will aid in obtaining the desired products. The use and choice of the protecting groups will be apparent to one skilled in chemical synthesis (see, for example, Greene, T. W.; Wuts, P. G. M. *Protective Groups in Organic Synthesis*, 2nd ed.; Wiley: New York, 1991). One skilled in the art will recognize that, in some cases, after the introduction of a given reagent as it is depicted in any individual scheme, it may be necessary to perform additional routine synthetic steps not described in detail to complete the synthesis of compounds of Formula I. One skilled in the art will also recognize that it may be necessary to perform a combination of the steps illustrated in the above schemes in an order other than that implied by the particular sequence presented to prepare the compounds of Formula I.

One skilled in the art will also recognize that compounds of Formula I and the intermediates described herein can be subjected to various electrophilic, nucleophilic, radical, organometallic, oxidation, and reduction reactions to add substituents or modify existing substituents.

Without further elaboration, it is believed that one skilled in the art using the preceding description can utilize the present invention to its fullest extent. The following Examples are, therefore, to be construed as merely illustrative, and not limiting of the disclosure in any way whatsoever. Percentages are by weight except for chromatographic solvent mixtures or where otherwise indicated. Parts and percentages for chromatographic solvent mixtures are by volume unless otherwise indicated. ^{1}H NMR spectra are reported in ppm downfield from tetramethylsilane; s is singlet, d is doublet, t is triplet, q is quartet, m is multiplet, dd is doublet of doublets, dt is doublet of triplets, br s is broad singlet.

EXAMPLE 1

Preparation of 8-methyl-3-(1-methylethyl)-2-[2-methyl-4-(trifluoromethyl)phenyl]-4(3H)-quinazolinone

Step A: Preparation of 3-methyl-*N*-(1-methylethyl)-2-nitrobenzamide

A solution of 3-methyl-2-nitrobenzoic acid (2.00 g, 11.0 mmol) and triethylamine (1.22 g, 12.1 mmol) in 25 mL of methylene chloride was cooled to 10°C. Ethyl chloroformate was carefully added and a solid precipitate formed. After stirring for 30 minutes isopropylamine (0.94 g, 16.0 mmol) was added and a homogeneous solution resulted. The reaction was stirred for an additional hour, poured into water and extracted with ethyl acetate. The organic extracts were washed with water, dried over magnesium sulfate and evaporated under reduced pressure to afford 1.96 g of the desired intermediate as a white solid melting at 126-128 °C.

^{1}H NMR ($CDCl_3$) δ 1.24 (d,6H), 2.38 (s,3H), 4.22 (m,1H), 5.80 (br s,1H), 7.4 (m,3H).

Step B: Preparation of 2-amino-3-methyl-*N*-(1-methylethyl)benzamide

The 2-nitrobenzamide of Step A (1.70 g, 7.6 mmol) was hydrogenated over 5% Pd/C in 40 mL of ethanol at 3.45 X 10^5 Pa. When the uptake of hydrogen ceased the reaction was filtered through celite and the celite was washed with ether. The filtrate was evaporated under reduced pressure to afford 1.41 g of the title compound as a solid melting at 149-151 °C.

^{1}H NMR ($CDCl_3$) δ 1.24 (dd,6H), 2.16 (s,3H), 4.25 (m,1H), 5.54 (br s,2H), 5.85 (br s,1H), 6.59 (t,1H), 7.13 (d,1H), 7.17 (d,1H).

Step C: Preparation of S,S-dimethyl-*N*-[4-(trifluoromethyl)phenyl]sulfilimine

A solution of *N*-chlorosuccinimide (12.43 g, 93.1 mmol) in ~170 mL of dichloromethane was added to a mixture of 4-(trifluoromethyl) aniline (15 g, 93.1 mmol) and dimethyl sulphide (6.35 g, 102 mmol) in 230 mL of dichloromethane at –5 to 0 °C. After the addition was complete, the mixture was stirred at 0-5 °C for 1 hour, and *N*-chlorosuccinimide (0.02 g, 4.64 mmol) was added. After a further 30 minutes, the mixture was washed with 500 mL of 1N sodium hydroxide.

The organic phase was dried and evaporated to give the product as a solid 19.72 g melting at 101-103 °C (after crystallization from ethyl acetate/hexanes).

IR (Nujol®) 1603, 1562, 1532, 1502, 1428, 1402, 1335, 1300, 1270, 1185, 1150, 1103, 1067, 1000, 972, 940, 906, 837, 817 cm^{-1}.

^{1}H NMR ($CDCl_3$) δ 7.35 (d,2H), 6.84 (d,2H), 2.67 (s,3H).

Step D: 2-[(methylthio)methyl]-4-(trifluoromethyl)benzenamine

Sodium methoxide in methanol (1.95 g, 9.02 mmol, 25%) was added to S,S-dimethyl-*N*-[4-(trifluoromethyl)phenyl]sulfilimine from Step C (2 g, 9.04 mmol) in 15 mL of toluene. The mixture was warmed to ~80°C for ~1 h. The mixture was allowed to cool to 25 °C and was poured into 100 mL of water. The mixture was extracted with 2x100 mL of ethyl acetate and the combined extracts were dried and evaporated to give the product 1.8 g as a solid melting at 65.5-67.5 °C (after crystallization from hexanes).

IR (Nujol®) 3419, 3333, 1629, 1584, 1512, 1440, 1334, 1302, 1235, 1193, 1139, 1098, 1078, 979, 904, 832 cm^{-1}.

^{1}H NMR ($CDCl_3$) δ 7.35 (dd,1H), 7.26 (s,1H), 6.72 (d,1H) 4.39 (br s,2H), 3.69 (s,2H), 1.99 (s,3H).

Step E: Preparation of 2-methyl-4-(trifluoromethyl)benzenamine

Activated Raney nickel (500 g wet paste, ~50μ) was added portionwise to a solution of 2-[(methylthio)methyl]-4-(trifluoromethyl)benzenamine (55.3 g, 0.25 mole) in 1 L of ethanol over 30 minutes at 25-30 °C. The heterogeneous mixture was stirred vigorously for 30 minutes after the addition. The stirring was stopped, and the solids were allowed to settle over one hour. The liquid was decanted from the solids and poured through filter paper. The filtrate was evaporated under reduced pressure, and the residue was taken up in

dichloromethane. The organic phase was separated from a small volume of water, dried over magnesium sulfate and evaporated under reduced pressure to afford 37.6 g of the title compound as an amber oil.

^{1}H NMR ($CDCl_3$) δ 7.28 (m,2H), 6.68 (d,1H), 3.87 (br s,2H), 2.19 (s,3H).

Step F: Preparation of 2-methyl-4-(trifluoromethyl)benzonitrile

Concentrated hydrochloric acid (16 mL) was added dropwise at a moderate rate to a heterogeneous mixture of 2-methyl-4-(trifluoromethyl)benzenamine (14 g, 80 mmol) and 120 mL of water while stirring vigorously. A thick suspension resulted which was stirred for 20 minutes, diluted with 280 mL of water and cooled to 5 °C. A solution of sodium nitrite (5.5 g, 80 mmol) in 25 mL of water was added slowly to the reaction suspension. After stirring for 30 minutes at 5 °C a solution resulted which was stirred cold for 30 more minutes and then neutralized with potassium carbonate. This diazonium salt solution was then added portionwise via cannula to a stirred, 95 °C mixture of potassium cyanide (22 g, 0.34 mole), copper sulfate pentahydrate (20 g, 80 mmol) and 140 mL of water. After the addition the mixture was stirred for 30 minutes at 95 °C and then allowed to cool to room temperature. Ether was added and the heterogeneous mixture was filtered through celite. The solids were washed with ether, and the filtrate was partitioned. The aqueous phase was extracted with ether, and the combined organic extracts were dried over magnesium sulfate and concentrated under reduced pressure to afford 13.1 g of the title compound as a brown oil.

^{1}H NMR ($CDCl_3$) δ 7.74 (d,1H), 7.60 (s,1H), 7.55 (d,1H), 2.64 (s,3H).

Step G: Preparation of 2-methyl-4-trifluoromethyl benzoic acid

Potassium hydroxide (15.7 g, 0.28 mole) and 15 mL of water were added as a solution to a stirred, heterogeneous mixture of 2-methyl-4-(trifluoromethyl)benzonitrile (13 g, 70 mmol) and 135 mL of ethylene glycol. The reaction mixture was heated at 120-130 °C for 20 hours and allowed to cool to room temperature. The dark solution was poured into 800 mL of water and filtered through celite. The filtrate was washed with ether and then the aqueous was acidified with concentrated hydrochloric acid. This aqueous phase was extracted three times with ethyl acetate, the organic extracts were combined, dried over magnesium sulfate and evaporated under reduced pressure to afford the title compound as a tan solid.

^{1}H NMR ($CDCl_3$) δ 7.98 (d,1H), 7.70 (s,1H), 7.65 (d,1H), 2.60 (s,3H).

Step H: Preparation of 2-methyl-4-(trifluoromethoxy)benzoyl chloride

Thionyl chloride (0.42 g, 3.5 mmol) was added to a solution of the benzoic acid from Step G (0.50 g, 2.4 mmol) in 10 mL of toluene at room temperature. The reaction was refluxed for three hours then cooled to room temperature. The solvent was evaporated under reduced pressure and excess thionyl chloride was removed by azeotroping with toluene. The benzoyl chloride obtained was used directly in Step I.

Step I: Preparation of 2-methyl-*N*-[2-methyl-6-[[(1-methylethyl)amino]-carbonyl]phenyl]-4-(trifluoromethyl)benzamide

The benzoyl chloride of Step H (0.29 g, 1.3 mmol) was added to a mixture of the aniline from Step B (0.36 g, 1.9 mmol) and diisopropylethylamine (0.26 g, 2.0 mmol) in 10 mL of chloroform at room temperature. The reaction was allowed to stir overnight. The solid precipitate was filtered and dried to afford 0.38 g of the title compound, as a solid melting at 247-248 °C.

^{1}H NMR ($CDCl_3$) δ 1.24 (d,6H), 2.41 (s,3H), 2.58 (s,3H), 4.20 (m,1H), 5.94 (br d,1H), 7.2-7.3 (m,2H), 7.40 (d,1H), 7.52 (s,1H), 7.53 (d,1H), 7.70 (d,1H), 9.36 (br s,1H).

Step J: Preparation of 8-methyl-3-(1-methylethyl)-2-[2-methyl-4-(trifluoromethyl)phenyl]-4(3H)-quinazolinone

A slurry of the benzamide of Step I (0.25 g, 0.6 mmol) in *N, N*-dimethylformamide (4 mL) was added cautiously to a slurry of NaH (0.03 g, 0.7 mmol, 60%) in *N,N*-dimethylformamide (2 mL). Gas evolution was seen and the mixture became a light yellow solution. After stirring for approximately 5 min, methylchloroformate (0.11 g, 1.2 mmol) was added and a solid precipitate formed. The reaction was stirred for 30 min, then poured into water (50 mL) and extracted with ethyl acetate (2x50 mL). The combined extracts were washed with water (2x50 mL) then dried and evaporated to give 0.16 g of the title compound, a compound of the invention, as a solid melting at 100-103 °C.

^{1}H NMR ($CDCl_3$) δ 1.25 (d,6H), 2.52 (s,3H), 2.81 (s,3H), 4.28 (m,1H), 7.26 (t,1H), 7.43 (d,1H), 7.57-7.61 (br s,2H), 7.98 (d,1H), 8.07 (d,1H).

EXAMPLE 2

Preparation of 6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline

Step A: Preparation of 2-amino-3-methyl-5-chlorobenzoic acid

To a solution of 2-amino-3-methylbenzoic acid (Aldrich, 15.0 g, 99.2 mmol) in *N,N*-dimethylformamide (50 mL) was added *N*-chlorosuccinimide (13.3 g, 99.2 mmol) and the reaction mixture was heated to 100 °C for 30 minutes. The heat was removed, the reaction was cooled to room temperature and let stand overnight. The reaction mixture was then slowly poured into ice-water (250 mL) to precipitate a white solid. The solid was filtered and washed four times with water and then taken up in ethyl acetate (900 mL). The ethyl acetate solution was dried over magnesium sulfate, evaporated under reduced pressure and the residual solid was washed with ether to afford the desired intermediate as a white solid (13.9 g).

^{1}H NMR (DMSO-d_6) δ 2.11 (s, 3H), 7.22 (s, 1H), 7.55 (s, 1H).

Step B: Preparation of 3-chloro-2-[3-(trifluoromethyl)-1*H*-pyrazol-1-yl]pyridine

To a mixture of 2,3-dichloropyridine (99.0 g, 0.67 mol) and 3-trifluoromethyl pyrazole (83 g, 0.61 mol) in dry *N*,*N*-dimethylformamide (300 mL) was added potassium carbonate (166.0 g, 1.2 mol) and the reaction was then heated to 110–125 °C over 48 hours. The reaction was cooled to 100 °C and filtered through Celite® diatomaceous filter aid to remove solids. *N*,*N*-Dimethylformamide and excess dichloropyridine were removed by distillation at atmospheric pressure. Distillation of the product at reduced pressure (b.p. 139–141 °C, 7 mm) afforded the desired intermediate as a clear yellow oil (113.4 g).

^{1}H NMR ($CDCl_3$) δ 6.78 (s, 1H), 7.36 (t, 1H), 7.93 (d, 1H), 8.15 (s, 1H), 8.45 (d, 1H).

Step C: Preparation of 1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazole-5-carboxylic acid

To a solution of the pyrazole product from Step B (105.0 g, 425 mmol) in dry tetrahydrofuran (700 mL) at –75 °C was added via cannula a –30 °C solution of lithium diisopropylamide (425 mmol) in dry tetrahydrofuran (300 mL). The deep red solution was stirred for 15 minutes, after which time carbon dioxide was bubbled through at –63 °C until the solution became pale yellow and the exothermicity ceased. The reaction was stirred for an additional 20 minutes and then quenched with water (20 mL). The solvent was removed under reduced pressure, and the reaction mixture partitioned between ether and 0.5 N aqueous sodium hydroxide solution. The aqueous extracts were washed with ether (3x), filtered through Celite® diatomaceous filter aid to remove residual solids, and then acidified to a pH of approximately 4, at which point an orange oil formed. The aqueous mixture was stirred vigorously and additional acid was added to lower the pH to 2.5–3. The orange oil congealed into a granular solid, which was filtered, washed successively with water and 1N hydrochloric acid, and dried under vacuum at 50 °C to afford the title product as an off-white solid (130 g). (Product from another run following similar procedure melted at 175-176 °C.)

^{1}H NMR (DMSO-d_6) δ 7.61 (s, 1H), 7.76 (dd, 1H), 8.31 (d, 1H), 8.60 (d, 1H).

Step D: Preparation of 6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-4*H*-3,1-benzoxazin-4-one

To a solution of methanesulfonyl chloride (2.2 mL, 28.3 mmol) in acetonitrile (75 mL) was added dropwise a mixture of the carboxylic acid product from Step C (7.5 g, 27.0 mmol) and triethylamine (3.75 mL, 27.0 mmol) in acetonitrile (75 mL) at 0–5 °C. The reaction temperature was then maintained at 0 °C throughout successive addition of reagents. After stirring for 20 minutes, 2-amino-3-methyl-5-chlorobenzoic acid from Step A (5.1 g, 27.0 mmol) was added and stirring was continued for an additional 5 minutes. A solution of triethylamine (7.5 mL, 54.0 mmol) in acetonitrile (15 mL) was then added dropwise, and the reaction mixture was stirred 45 minutes, followed by the addition of methanesulfonyl chloride (2.2 mL, 28.3 mmol). The reaction mixture was then warmed to room temperature and stirred overnight. Approximately 75 mL of water was then added to precipitate 5.8 g of

a yellow solid. An additional 1 g of product was isolated by extraction from the filtrate to provide a total of 6.8 g of the title compound as a yellow solid.

^{1}H NMR ($CDCl_3$) δ 1.83 (s, 3H), 7.50 (s, 1H), 7.53 (m, 2H), 7.99 (m, 2H), 8.58 (d, 1H).

Step E: Preparation of *N*-[4-chloro-2-methyl-6-[(methylamino)carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazole-5-carboxamide

To a solution of the benzoxazinone product of Step D (6.6 g, 15 mmol) in tetrahydrofuran (50 mL) was added methylamine (2.0 M solution in THF, 38 mL, 77.38 mmol), and the reaction mixture was heated to 60 °C, stirred for 1 hour and then cooled to room temperature. The tetrahydrofuran solvent was evaporated under reduced pressure, and the residual solid was purified by chromatography on silica gel to afford the title compound, as a white solid melting at 225-226 °C.

^{1}H NMR ($CDCl_3$) δ 2.17 (s,3H), 2.95 (m,3H), 6.2 (m,1H), 7.2 (m,2H), 7.4 (m,2H), 7.85 (md,1H), 8.45 (md,1H), 10.2 (br s, 1H).

Step F: Preparation of 6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline

A solution of the title compound from Step E (50 mg, 0.11 mmol) in dichloromethane (20 mL) was mixed with 2 g of montmorillonite K10 clay (Aldrich, preactivated by heating under vacuum) and evaporated to dryness *in vacuo*. The dry residue was heated using a steam bath (ca. 90-95 °C) for a total of 24 hours. The solids were then extracted twice by mixing with dichloromethane and ethyl acetate (1:1) and filtering. The combined filtrates were evaporated to leave a film. This material was chromatographed on silica gel using 5% ethyl acetate in dichloromethane as the eluant. Pure fractions were combined, evaporated and the residue crystallized from dichloromethane/hexanes to afford 15 mg of the title compound, a compound of the invention, as a white solid.

IR (KBr) 1674, 1598, 1462, 1241, 1194, 1169, 1140 cm^{-1}.

^{1}H NMR ($CDCl_3$) δ 2.10 (s,3H), 3.78 (s,3H), 7.06 (s, 1H), 7.37 (dd,1H), 7.42 (d,1H), 7.87 (dd,1H).

EXAMPLE 3

Preparation of 8-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazolinone

Step A: Preparation of 8-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-4*H*-3,1-benzoxazin-4-one

Application of the procedure of Example 2, Step D with 2.91 g of the carboxylic acid of Example 2, Step C and 1.71 g of 2-amino-3-chlorobenzoic acid affords 2.5 g of the title benzoxazinone.

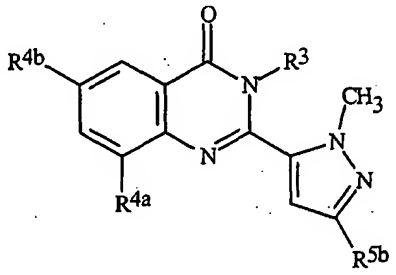
^{1}H NMR ($CDCl_3$) δ 7.46 (t,1H), 7.50 (m,1H), 7.52 (s,1H), 7.76 (d,1H), 8.00 (d,1H), 8.11 (d,1H), 8.58 (d, 1H).

Step B: Preparation of 8-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazolinone

A solution of the title compound of Step A (300 mg) in 2 mL of tetrahydrofuran was treated with methylamine (2.0 M solution in THF, 10 mL), sealed in a capped bottle and stirred for four days at room temperature. The solvent was removed under reduced pressure and the solid residue was washed with ether. The ether soluble material was purified by chromatography on silica gel using hexanes/ethyl acetate (1:1) as eluant. The title compound, a compound of the invention, was isolated as a solid, m.p. 155-157 °C. ^{1}H NMR ($CDCl_3$) δ 3.8 (s,3H), 7.1 (s,1H), 7.4 (m,2H), 7.7 (d,1H), 7.9 (d,1H), 8.15 (d,1H), 8.35 (m,1H).

By the procedures described herein together with methods known in the art, the following compounds of Tables 1 to 33 can be prepared. The following abbreviations are used in the Tables: *t* is tertiary, *s* is secondary, *n* is normal, *i* is iso, *c* is cyclo, Me is methyl, Et is ethyl, Pr is propyl, *i*-Pr is isopropyl, *t*-Bu is tert butyl, Ph is phenyl, OMe is methoxy, OEt is ethoxy, SMe is methylthio, SEt is ethylthio, CN is cyano, NO_2 is nitro, TMS is trimethylsilyl, S(O)Me is methylsulfinyl, and $S(O)_2$Me is methylsulfonyl.

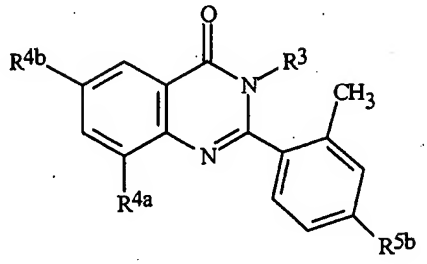
Table 1



R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br

R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

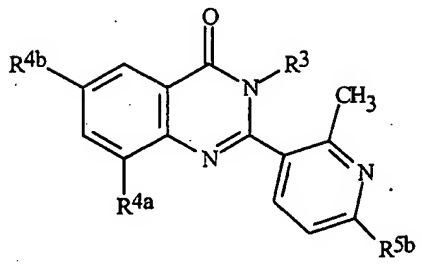
Table 2



R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br

R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

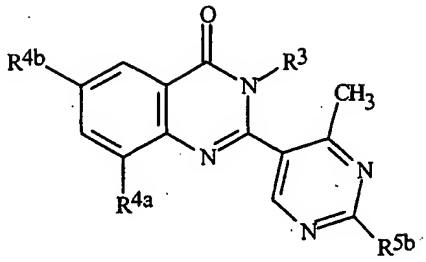
Table 3



R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H

R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

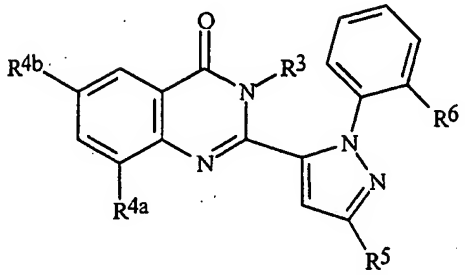
Table 4



R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H

R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

Table 5



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	H	Cl	Br	Me	Cl	Br	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	H	Cl	Br	Et	Cl	Br	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	H	Br	Cl	Me	Cl	Br	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	H	Br	Cl	Et	Cl	Br	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	H	Br	Cl	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	H	Br	Cl	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	H	Br	Br	Me	Cl	Br	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	H	Br	Br	Et	Cl	Br	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	H	Br	Br	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	H	Br	Br	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	H	CF_3	Cl	Me	Cl	I	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	H	CF_3	Cl	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl	*t*-Bu	Cl	I	CF_3	Cl

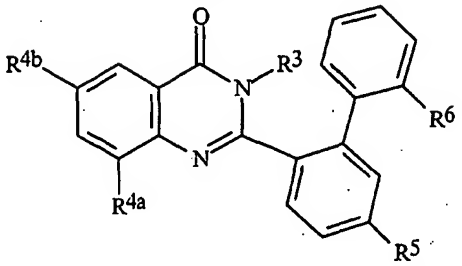
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	Br	Cl	Me	Cl	H	CF_3	Br	Me	Cl	I	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	H	CF_3	Br	Et	Cl	I	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	H	CF_3	Br	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	H	CF_3	Br	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	H	Cl	Cl	Me	Cl	I	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	H	Cl	Cl	Et	Cl	I	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	CH_3	Cl	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	CH_3	Cl	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	F	CF_3	Br	Me	CH_3	Cl	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	F	CF_3	Br	Et	CH_3	Cl	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	F	Cl	Cl	Me	CH_3	Cl	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	F	Cl	Cl	Et	CH_3	Cl	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	F	Cl	Br	Me	CH_3	Cl	Cl	Br	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	CH_3	Cl	Cl	Br	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	CH_3	Cl	Br	Cl	Me	Cl	CF_3	CF_3	Br
Et	CH_3	F	Br	Cl	Et	CH_3	Cl	Br	Cl	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	F	Br	Br	Me	CH_3	Cl	Br	Br	Me	Cl	CF_3	Cl	Cl
Et	CH_3	F	Br	Br	Et	CH_3	Cl	Br	Br	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	CH_3	Cl	Br	Br	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	CH_3	Cl	Br	Br	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	CF_3	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Cl	F	Cl	Br	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Cl	F	Cl	Br	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Cl	F	Br	Cl	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Cl	F	Br	Cl	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Cl	F	Br	Br	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Cl	F	Br	Br	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Cl	F	Br	Br	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	CF_3	Cl	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	CF_3	Cl	Et	Br	Cl	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	CF_3	CF_3	Br	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	CF_3	CF_3	Br	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	CF_3	Cl	Cl	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	CF_3	Cl	Cl	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	CF_3	Cl	Br	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	CF_3	Cl	Br	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	CF_3	Br	Cl	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	CF_3	Br	Cl	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	Br	CF_3	Br	Br	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	Br	CF_3	Br	Br	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Cl	Me	Br	I	CF_3	Cl	Me	Br	Br	CF_3	Cl
Et	CH_3	CF_3	Br	Cl	Et	Br	I	CF_3	Cl	Et	Br	Br	CF_3	Cl
i-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Cl
t-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Cl
Me	CH_3	CF_3	Br	Br	Me	Br	I	CF_3	Br	Me	Br	Br	CF_3	Br
Et	CH_3	CF_3	Br	Br	Et	Br	I	CF_3	Br	Et	Br	Br	CF_3	Br
i-Pr	CH_3	CF_3	Br	Br	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Br	Br	CF_3	Br
t-Bu	CH_3	CF_3	Br	Br	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Br	Br	CF_3	Br
n-Pr	CH_3	Cl	Cl	Cl	Me	Br	I	Cl	Cl	Me	Br	Br	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl	Et	Br	I	Cl	Cl	Et	Br	Br	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Br	Br	Cl	Cl
i-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Br	Br	Cl	Cl
Me	Cl	Cl	Br	Cl	Me	Br	I	Cl	Br	Me	Br	Br	Cl	Br
Et	Cl	Cl	Br	Cl	Et	Br	I	Cl	Br	Et	Br	Br	Cl	Br
i-Pr	Cl	Cl	Br	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Br	Br	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	Cl	Cl	Br	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Br	Br	Cl	Br
Me	Cl	Cl	Br	Br	Me	Br	I	Br	Cl	Me	Br	Br	Br	Cl
Et	Cl	Cl	Br	Br	Et	Br	I	Br	Cl	Et	Br	Br	Br	Cl
i-Pr	Cl	Cl	Br	Br	*i*-Pr	Br	I	Br	Cl	*i*-Pr	Br	Br	Br	Cl
t-Bu	Cl	Cl	Br	Br	*t*-Bu	Br	I	Br	Cl	*t*-Bu	Br	Br	Br	Cl
Me	Cl	Br	CF_3	Cl	Me	Br	I	Br	Br	Me	Br	Br	Br	Br
Et	Cl	Br	CF_3	Cl	Et	Br	I	Br	Br	Et	Br	Br	Br	Br
i-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	Br	Br	Br
t-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	Br	Br	Br
Me	Cl	Br	CF_3	Br	Me	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	CF_3	Br
Et	Cl	Br	CF_3	Br	Et	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl
i-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	Br	Cl	Cl					

Table 6



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	H	Cl	Br	Me	Cl	Br	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	H	Cl	Br	Et	Cl	Br	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	H	Br	Cl	Me	Cl	Br	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	H	Br	Cl	Et	Cl	Br	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	H	Br	Cl	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	H	Br	Cl	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	H	Br	Br	Me	Cl	Br	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	H	Br	Br	Et	Cl	Br	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	H	Br	Br	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	H	Br	Br	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	H	CF_3	Cl	Me	Cl	I	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	H	CF_3	Cl	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl	*t*-Bu	Cl	I	CF_3	Cl

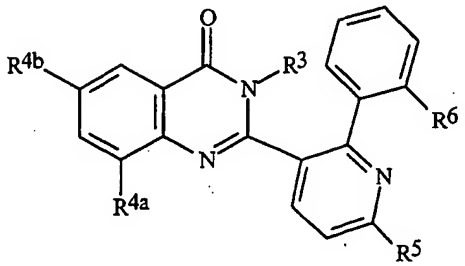
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	Br	Cl	Me	Cl	H	CF_3	Br	Me	Cl	I	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	H	CF_3	Br	Et	Cl	I	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	H	CF_3	Br	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	H	CF_3	Br	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	H	Cl	Cl	Me	Cl	I	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	H	Cl	Cl	Et	Cl	I	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	CH_3	Cl	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	CH_3	Cl	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	F	CF_3	Br	Me	CH_3	Cl	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	F	CF_3	Br	Et	CH_3	Cl	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	F	Cl	Cl	Me	CH_3	Cl	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	F	Cl	Cl	Et	CH_3	Cl	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	F	Cl	Br	Me	CH_3	Cl	Cl	Br	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	CH_3	Cl	Cl	Br	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	CH_3	Cl	Br	Cl	Me	Cl	CF_3	CF_3	Br
Et	CH_3	F	Br	Cl	Et	CH_3	Cl	Br	Cl	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	F	Br	Br	Me	CH_3	Cl	Br	Br	Me	Cl	CF_3	Cl	Cl
Et	CH_3	F	Br	Br	Et	CH_3	Cl	Br	Br	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	CH_3	Cl	Br	Br	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	CH_3	Cl	Br	Br	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	CF_3	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Cl	F	Cl	Br	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Cl	F	Cl	Br	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Cl	F	Br	Cl	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Cl	F	Br	Cl	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Cl	F	Br	Br	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Cl	F	Br	Br	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Cl	F	Br	Br	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	CF_3	Cl	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	CF_3	Cl	Et	Br	Cl	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	CF_3	CF_3	Br	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	CF_3	CF_3	Br	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	CF_3	Cl	Cl	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	CF_3	Cl	Cl	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	CF_3	Cl	Br	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	CF_3	Cl	Br	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	CF_3	Br	Cl	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	CF_3	Br	Cl	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	Br	CF_3	Br	Br	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	Br	CF_3	Br	Br	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Cl	Me	Br	I	CF_3	Cl	Me	Br	Br	CF_3	Cl
Et	CH_3	CF_3	Br	Cl	Et	Br	I	CF_3	Cl	Et	Br	Br	CF_3	Cl
i-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Cl
t-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Cl
Me	CH_3	CF_3	Br	Br	Me	Br	I	CF_3	Br	Me	Br	Br	CF_3	Br
Et	CH_3	CF_3	Br	Br	Et	Br	I	CF_3	Br	Et	Br	Br	CF_3	Br
i-Pr	CH_3	CF_3	Br	Br	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Br	Br	CF_3	Br
t-Bu	CH_3	CF_3	Br	Br	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Br	Br	CF_3	Br
n-Pr	CH_3	Cl	Cl	Cl	Me	Br	I	Cl	Cl	Me	Br	Br	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl	Et	Br	I	Cl	Cl	Et	Br	Br	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Br	Br	Cl	Cl
i-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Br	Br	Cl	Cl
Me	Cl	Cl	Br	Cl	Me	Br	I	Cl	Br	Me	Br	Br	Cl	Br
Et	Cl	Cl	Br	Cl	Et	Br	I	Cl	Br	Et	Br	Br	Cl	Br
i-Pr	Cl	Cl	Br	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Br	Br	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	Cl	Cl	Br	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Br	Br	Cl	Br
Me	Cl	Cl	Br	Br	Me	Br	I	Br	Cl	Me	Br	Br	Br	Cl
Et	Cl	Cl	Br	Br	Et	Br	I	Br	Cl	Et	Br	Br	Br	Cl
i-Pr	Cl	Cl	Br	Br	*i*-Pr	Br	I	Br	Cl	*i*-Pr	Br	Br	Br	Cl
t-Bu	Cl	Cl	Br	Br	*t*-Bu	Br	I	Br	Cl	*t*-Bu	Br	Br	Br	Cl
Me	Cl	Br	CF_3	Cl	Me	Br	I	Br	Br	Me	Br	Br	Br	Br
Et	Cl	Br	CF_3	Cl	Et	Br	I	Br	Br	Et	Br	Br	Br	Br
i-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	Br	Br	Br
t-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	Br	Br	Br
Me	Cl	Br	CF_3	Br	Me	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	CF_3	Br
Et	Cl	Br	CF_3	Br	Et	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl
i-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	Br	Cl	Cl					

Table 7



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	H	Cl	Br	Me	Cl	Br	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	H	Cl	Br	Et	Cl	Br	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	H	Br	Cl	Me	Cl	Br	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	H	Br	Cl	Et	Cl	Br	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	H	Br	Cl	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	H	Br	Cl	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	H	Br	Br	Me	Cl	Br	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	H	Br	Br	Et	Cl	Br	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	H	Br	Br	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	H	Br	Br	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	H	CF_3	Cl	Me	Cl	I	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	H	CF_3	Cl	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl	*t*-Bu	Cl	I	CF_3	Cl

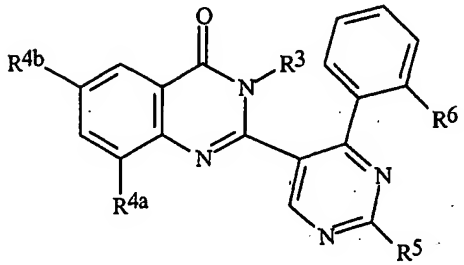
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	Br	Cl	Me	Cl	H	CF_3	Br	Me	Cl	I	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	H	CF_3	Br	Et	Cl	I	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	H	CF_3	Br	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	H	CF_3	Br	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	H	Cl	Cl	Me	Cl	I	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	H	Cl	Cl	Et	Cl	I	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	CH_3	Cl	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	CH_3	Cl	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	F	CF_3	Br	Me	CH_3	Cl	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	F	CF_3	Br	Et	CH_3	Cl	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	F	Cl	Cl	Me	CH_3	Cl	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	F	Cl	Cl	Et	CH_3	Cl	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	F	Cl	Br	Me	CH_3	Cl	Cl	Br	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	CH_3	Cl	Cl	Br	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	CH_3	Cl	Br	Cl	Me	Cl	CF_3	CF_3	Br
Et	CH_3	F	Br	Cl	Et	CH_3	Cl	Br	Cl	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	F	Br	Br	Me	CH_3	Cl	Br	Br	Me	Cl	CF_3	Cl	Cl
Et	CH_3	F	Br	Br	Et	CH_3	Cl	Br	Br	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	CH_3	Cl	Br	Br	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	CH_3	Cl	Br	Br	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	CF_3	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Cl	F	Cl	Br	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Cl	F	Cl	Br	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Cl	F	Br	Cl	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Cl	F	Br	Cl	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Cl	F	Br	Br	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Cl	F	Br	Br	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Cl	F	Br	Br	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	CF_3	Cl	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	CF_3	Cl	Et	Br	Cl	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	CF_3	CF_3	Br	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	CF_3	CF_3	Br	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	CF_3	Cl	Cl	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	CF_3	Cl	Cl	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	CF_3	Cl	Br	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	CF_3	Cl	Br	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	CF_3	Br	Cl	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	CF_3	Br	Cl	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	Br	CF_3	Br	Br	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	Br	CF_3	Br	Br	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Cl	Me	Br	I	CF_3	Cl	Me	Br	Br	CF_3	Cl
Et	CH_3	CF_3	Br	Cl	Et	Br	I	CF_3	Cl	Et	Br	Br	CF_3	Cl
i-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Cl
t-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Cl
Me	CH_3	CF_3	Br	Br	Me	Br	I	CF_3	Br	Me	Br	Br	CF_3	Br
Et	CH_3	CF_3	Br	Br	Et	Br	I	CF_3	Br	Et	Br	Br	CF_3	Br
i-Pr	CH_3	CF_3	Br	Br	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Br	Br	CF_3	Br
t-Bu	CH_3	CF_3	Br	Br	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Br	Br	CF_3	Br
n-Pr	CH_3	Cl	Cl	Cl	Me	Br	I	Cl	Cl	Me	Br	Br	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl	Et	Br	I	Cl	Cl	Et	Br	Br	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Br	Br	Cl	Cl
i-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Br	Br	Cl	Cl
Me	Cl	Cl	Br	Cl	Me	Br	I	Cl	Br	Me	Br	Br	Cl	Br
Et	Cl	Cl	Br	Cl	Et	Br	I	Cl	Br	Et	Br	Br	Cl	Br
i-Pr	Cl	Cl	Br	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Br	Br	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	Cl	Cl	Br	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Br	Br	Cl	Br
Me	Cl	Cl	Br	Br	Me	Br	I	Br	Cl	Me	Br	Br	Br	Cl
Et	Cl	Cl	Br	Br	Et	Br	I	Br	Cl	Et	Br	Br	Br	Cl
i-Pr	Cl	Cl	Br	Br	*i*-Pr	Br	I	Br	Cl	*i*-Pr	Br	Br	Br	Cl
t-Bu	Cl	Cl	Br	Br	*t*-Bu	Br	I	Br	Cl	*t*-Bu	Br	Br	Br	Cl
Me	Cl	Br	CF_3	Cl	Me	Br	I	Br	Br	Me	Br	Br	Br	Br
Et	Cl	Br	CF_3	Cl	Et	Br	I	Br	Br	Et	Br	Br	Br	Br
i-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	Br	Br	Br
t-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	Br	Br	Br
Me	Cl	Br	CF_3	Br	Me	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	CF_3	Br
Et	Cl	Br	CF_3	Br	Et	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl
i-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	Br	Cl	Cl					

Table 8



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	H	Cl	Br	Me	Cl	Br	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	H	Cl	Br	Et	Cl	Br	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	H	Br	Cl	Me	Cl	Br	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	H	Br	Cl	Et	Cl	Br	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	H	Br	Cl	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	H	Br	Cl	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	H	Br	Br	Me	Cl	Br	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	H	Br	Br	Et	Cl	Br	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	H	Br	Br	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	H	Br	Br	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	H	CF_3	Cl	Me	Cl	I	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	H	CF_3	Cl	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl	*t*-Bu	Cl	I	CF_3	Cl

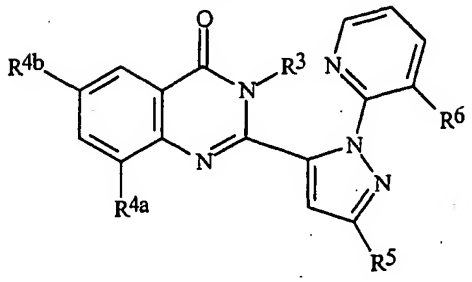
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	Br	Cl	Me	Cl	H	CF_3	Br	Me	Cl	I	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	H	CF_3	Br	Et	Cl	I	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	H	CF_3	Br	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	H	CF_3	Br	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	H	Cl	Cl	Me	Cl	I	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	H	Cl	Cl	Et	Cl	I	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	CH_3	Cl	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	CH_3	Cl	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	F	CF_3	Br	Me	CH_3	Cl	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	F	CF_3	Br	Et	CH_3	Cl	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	F	Cl	Cl	Me	CH_3	Cl	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	F	Cl	Cl	Et	CH_3	Cl	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	F	Cl	Br	Me	CH_3	Cl	Cl	Br	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	CH_3	Cl	Cl	Br	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	CH_3	Cl	Br	Cl	Me	Cl	CF_3	CF_3	Br
Et	CH_3	F	Br	Cl	Et	CH_3	Cl	Br	Cl	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	F	Br	Br	Me	CH_3	Cl	Br	Br	Me	Cl	CF_3	Cl	Cl
Et	CH_3	F	Br	Br	Et	CH_3	Cl	Br	Br	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	CH_3	Cl	Br	Br	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	CH_3	Cl	Br	Br	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	CF_3	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Cl	F	Cl	Br	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Cl	F	Cl	Br	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Cl	F	Br	Cl	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Cl	F	Br	Cl	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Cl	F	Br	Br	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Cl	F	Br	Br	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Cl	F	Br	Br	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	CF_3	Cl	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	CF_3	Cl	Et	Br	Cl	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	CF_3	CF_3	Br	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	CF_3	CF_3	Br	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	CF_3	Cl	Cl	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	CF_3	Cl	Cl	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	CF_3	Cl	Br	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	CF_3	Cl	Br	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	CF_3	Br	Cl	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	CF_3	Br	Cl	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	Br	CF_3	Br	Br	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	Br	CF_3	Br	Br	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Cl	Me	Br	I	CF_3	Cl	Me	Br	Br	CF_3	Cl
Et	CH_3	CF_3	Br	Cl	Et	Br	I	CF_3	Cl	Et	Br	Br	CF_3	Cl
i-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Cl
t-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Cl
Me	CH_3	CF_3	Br	Br	Me	Br	I	CF_3	Br	Me	Br	Br	CF_3	Br
Et	CH_3	CF_3	Br	Br	Et	Br	I	CF_3	Br	Et	Br	Br	CF_3	Br
i-Pr	CH_3	CF_3	Br	Br	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Br	Br	CF_3	Br
t-Bu	CH_3	CF_3	Br	Br	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Br	Br	CF_3	Br
n-Pr	CH_3	Cl	Cl	Cl	Me	Br	I	Cl	Cl	Me	Br	Br	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl	Et	Br	I	Cl	Cl	Et	Br	Br	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Br	Br	Cl	Cl
i-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Br	Br	Cl	Cl
Me	Cl	Cl	Br	Cl	Me	Br	I	Cl	Br	Me	Br	Br	Cl	Br
Et	Cl	Cl	Br	Cl	Et	Br	I	Cl	Br	Et	Br	Br	Cl	Br
i-Pr	Cl	Cl	Br	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Br	Br	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	Cl	Cl	Br	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Br	Br	Cl	Br
Me	Cl	Cl	Br	Br	Me	Br	I	Br	Cl	Me	Br	Br	Br	Cl
Et	Cl	Cl	Br	Br	Et	Br	I	Br	Cl	Et	Br	Br	Br	Cl
i-Pr	Cl	Cl	Br	Br	*i*-Pr	Br	I	Br	Cl	*i*-Pr	Br	Br	Br	Cl
t-Bu	Cl	Cl	Br	Br	*t*-Bu	Br	I	Br	Cl	*t*-Bu	Br	Br	Br	Cl
Me	Cl	Br	CF_3	Cl	Me	Br	I	Br	Br	Me	Br	Br	Br	Br
Et	Cl	Br	CF_3	Cl	Et	Br	I	Br	Br	Et	Br	Br	Br	Br
i-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	Br	Br	Br
t-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	Br	Br	Br
Me	Cl	Br	CF_3	Br	Me	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	CF_3	Br
Et	Cl	Br	CF_3	Br	Et	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl
i-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	Br	Cl	Cl					

Table 9



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	H	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	H	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	H	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	H	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	H	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	H	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	H	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	H	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	H	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	H	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	F	Cl	Br	Me	Cl	H	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	F	Cl	Br	Et	Cl	H	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl

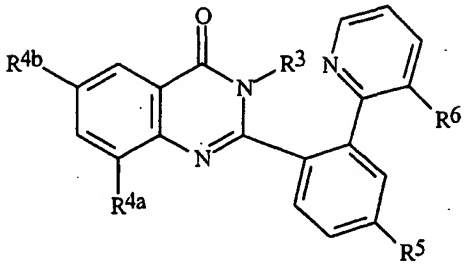
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	F	Br	Cl	Me	Cl	H	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	F	Br	Cl	Et	Cl	H	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Cl	H	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Cl	H	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	F	Br	Br	Me	Cl	H	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	F	Br	Br	Et	Cl	H	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
t-Bu	CH_3	H	Br	Br	*t*-Bu	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Cl	Br	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Cl	Br	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	F	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Cl	Br	Br	Cl
Et	CH_3	F	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Cl	Br	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	F	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Cl	Br	Br	Br
Et	CH_3	F	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Cl	Br	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	F	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Cl	I	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	Cl	Cl	Br	Cl	Me	Cl	I	CF_3	Br
Et	CH_3	F	Br	Cl	Et	Cl	Cl	Br	Cl	Et	Cl	I	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	Cl	Cl	Br	Cl	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	Cl	Cl	Br	Cl	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	F	Br	Br	Me	Cl	Cl	Br	Br	Me	Cl	I	Cl	Cl
Et	CH_3	F	Br	Br	Et	Cl	Cl	Br	Br	Et	Cl	I	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	Cl	Cl	Br	Br	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	Cl	Cl	Br	Br	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	Cl	CF_3	Cl	Me	Cl	Br	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	Cl	CF_3	Cl	Et	Cl	Br	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	Cl	CF_3	Br	Me	Cl	Br	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	Cl	CF_3	Br	Et	Cl	Br	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	Br	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	Cl	Cl	Cl	Me	Cl	Br	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	Cl	Cl	Cl	Et	Cl	Br	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	Br	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	Cl	Cl	Br	Me	Br	Br	Br	Cl	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	Cl	Cl	Br	Et	Br	Br	Br	Cl	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Br	Br	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Br	Br	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	Cl	Br	Cl	Me	Br	Br	Br	Br	Me	Cl	CF_3	CF_3	Br
Et	CH_3	Cl	Br	Cl	Et	Br	Br	Br	Br	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Br	Br	Br	Br	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Br	Br	Br	Br	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	Cl	Br	Br	Me	Br	I	CF_3	Cl	Me	Cl	CF_3	Cl	Cl
Et	CH_3	Cl	Br	Br	Et	Br	I	CF_3	Cl	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	Cl	Br	Br	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	Cl	Br	Br	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Br	I	CF_3	Br	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Br	I	CF_3	Br	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Br	I	Cl	Cl	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Br	I	Cl	Cl	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Br	I	Cl	Br	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Br	I	Cl	Br	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Br	I	Br	Cl	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Br	I	Br	Cl	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Br	I	Br	Cl	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Br	I	Br	Cl	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Br	I	Br	Br	Me	Br	F	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	Br	Cl	Et	Br	I	Br	Br	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Br	CF_3	CF_3	Cl	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Br	CF_3	CF_3	Cl	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Br	CF_3	CF_3	Br	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Br	CF_3	CF_3	Br	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Br	CF_3	Cl	Cl	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Br	CF_3	Cl	Cl	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Br	CF_3	Cl	Br	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Br	CF_3	Cl	Br	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Br	CF_3	Br	Cl	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Br	CF_3	Br	Cl	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	Br	Br	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	Br	Br	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	Br	CF_3	Cl	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	Br	CF_3	Cl	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	Br	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	Br	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	Br	CF_3	Br	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	Br	CF_3	Br	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Br	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Br	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	Br	Cl	Cl	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	Br	Cl	Cl	Et	Br	Cl	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	Br	Cl	Br	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	Br	Cl	Br	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	Br	Cl	Br	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	Br	Cl	Br	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	CH_3	CF_3	Br	Cl	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	CH_3	CF_3	Br	Cl	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Br	*n*-Pr	CH_3	Cl	Cl	Cl	*t*-Bu	CH_3	CF_3	Br	Br
Et	CH_3	CF_3	Br	Br	*n*-Bu	CH_3	Cl	Cl	Cl	*i*-Bu	CH_3	Cl	Cl	Cl
i-Pr	CH_3	CF_3	Br	Br	*s*-Bu	CH_3	Cl	Cl	Cl					

Table 10



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	H	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	H	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	H	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	H	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	H	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	H	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	H	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	H	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	H	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	H	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	F	Cl	Br	Me	Cl	H	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	F	Cl	Br	Et	Cl	H	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl

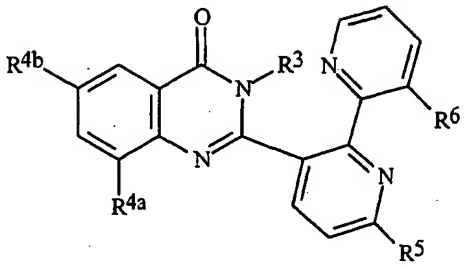
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	F	Br	Cl	Me	Cl	H	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	F	Br	Cl	Et	Cl	H	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Cl	H	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Cl	H	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	F	Br	Br	Me	Cl	H	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	F	Br	Br	Et	Cl	H	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
t-Bu	CH_3	H	Br	Br	*t*-Bu	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Cl	Br	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Cl	Br	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	F	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Cl	Br	Br	Cl
Et	CH_3	F	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Cl	Br	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	F	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Cl	Br	Br	Br
Et	CH_3	F	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Cl	Br	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	F	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Cl	I	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	Cl	Cl	Br	Cl	Me	Cl	I	CF_3	Br
Et	CH_3	F	Br	Cl	Et	Cl	Cl	Br	Cl	Et	Cl	I	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	Cl	Cl	Br	Cl	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	Cl	Cl	Br	Cl	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	F	Br	Br	Me	Cl	Cl	Br	Br	Me	Cl	I	Cl	Cl
Et	CH_3	F	Br	Br	Et	Cl	Cl	Br	Br	Et	Cl	I	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	Cl	Cl	Br	Br	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	Cl	Cl	Br	Br	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	Cl	CF_3	Cl	Me	Cl	Br	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	Cl	CF_3	Cl	Et	Cl	Br	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	Cl	CF_3	Br	Me	Cl	Br	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	Cl	CF_3	Br	Et	Cl	Br	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	Br	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	Cl	Cl	Cl	Me	Cl	Br	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	Cl	Cl	Cl	Et	Cl	Br	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	Br	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	Cl	Cl	Br	Me	Br	Br	Br	Cl	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	Cl	Cl	Br	Et	Br	Br	Br	Cl	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Br	Br	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Br	Br	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	Cl	Br	Cl	Me	Br	Br	Br	Br	Me	Cl	CF_3	CF_3	Br
Et	CH_3	Cl	Br	Cl	Et	Br	Br	Br	Br	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Br	Br	Br	Br	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Br	Br	Br	Br	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	Cl	Br	Br	Me	Br	I	CF_3	Cl	Me	Cl	CF_3	Cl	Cl
Et	CH_3	Cl	Br	Br	Et	Br	I	CF_3	Cl	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	Cl	Br	Br	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	Cl	Br	Br	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Br	I	CF_3	Br	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Br	I	CF_3	Br	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Br	I	Cl	Cl	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Br	I	Cl	Cl	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Br	I	Cl	Br	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Br	I	Cl	Br	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Br	I	Br	Cl	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Br	I	Br	Cl	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Br	I	Br	Cl	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Br	I	Br	Cl	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Br	I	Br	Br	Me	Br	F	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	Br	Cl	Et	Br	I	Br	Br	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Br	CF_3	CF_3	Cl	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Br	CF_3	CF_3	Cl	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Br	CF_3	CF_3	Br	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Br	CF_3	CF_3	Br	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Br	CF_3	Cl	Cl	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Br	CF_3	Cl	Cl	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Br	CF_3	Cl	Br	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Br	CF_3	Cl	Br	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Br	CF_3	Br	Cl	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Br	CF_3	Br	Cl	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	Br	Br	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	Br	Br	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	Br	CF_3	Cl	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	Br	CF_3	Cl	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	Br	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	Br	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	Br	CF_3	Br	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	Br	CF_3	Br	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Br	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Br	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	Br	Cl	Cl	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	Br	Cl	Cl	Et	Br	Cl	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	Br	Cl	Br	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	Br	Cl	Br	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	Br	Cl	Br	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	Br	Cl	Br	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	CH_3	CF_3	Br	Cl	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	CH_3	CF_3	Br	Cl	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Br	*n*-Pr	CH_3	Cl	Cl	Cl	*t*-Bu	CH_3	CF_3	Br	Br
Et	CH_3	CF_3	Br	Br	*n*-Bu	CH_3	Cl	Cl	Cl	*i*-Bu	CH_3	Cl	Cl	Cl
i-Pr	CH_3	CF_3	Br	Br	*s*-Bu	CH_3	Cl	Cl	Cl					

Table 11



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	H	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	H	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	H	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	H	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	H	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	H	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	H	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	H	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	H	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	H	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	F	Cl	Br	Me	Cl	H	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	F	Cl	Br	Et	Cl	H	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl

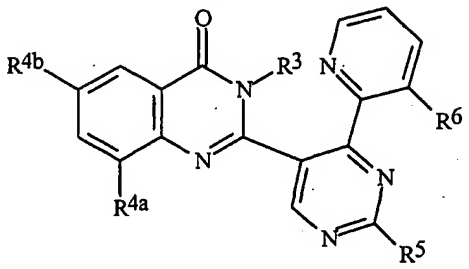
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	F	Br	Cl	Me	Cl	H	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	F	Br	Cl	Et	Cl	H	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Cl	H	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Cl	H	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	F	Br	Br	Me	Cl	H	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	F	Br	Br	Et	Cl	H	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
t-Bu	CH_3	H	Br	Br	*t*-Bu	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Cl	Br	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Cl	Br	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	F	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Cl	Br	Br	Cl
Et	CH_3	F	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Cl	Br	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	F	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Cl	Br	Br	Br
Et	CH_3	F	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Cl	Br	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	F	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Cl	I	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	Cl	Cl	Br	Cl	Me	Cl	I	CF_3	Br
Et	CH_3	F	Br	Cl	Et	Cl	Cl	Br	Cl	Et	Cl	I	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	Cl	Cl	Br	Cl	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	Cl	Cl	Br	Cl	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	F	Br	Br	Me	Cl	Cl	Br	Br	Me	Cl	I	Cl	Cl
Et	CH_3	F	Br	Br	Et	Cl	Cl	Br	Br	Et	Cl	I	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	Cl	Cl	Br	Br	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	Cl	Cl	Br	Br	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	Cl	CF_3	Cl	Me	Cl	Br	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	Cl	CF_3	Cl	Et	Cl	Br	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	Cl	CF_3	Br	Me	Cl	Br	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	Cl	CF_3	Br	Et	Cl	Br	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	Br	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	Cl	Cl	Cl	Me	Cl	Br	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	Cl	Cl	Cl	Et	Cl	Br	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	Br	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	Cl	Cl	Br	Me	Br	Br	Br	Cl	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	Cl	Cl	Br	Et	Br	Br	Br	Cl	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Br	Br	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Br	Br	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	Cl	Br	Cl	Me	Br	Br	Br	Br	Me	Cl	CF_3	CF_3	Br
Et	CH_3	Cl	Br	Cl	Et	Br	Br	Br	Br	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Br	Br	Br	Br	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Br	Br	Br	Br	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	Cl	Br	Br	Me	Br	I	CF_3	Cl	Me	Cl	CF_3	Cl	Cl
Et	CH_3	Cl	Br	Br	Et	Br	I	CF_3	Cl	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	Cl	Br	Br	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	Cl	Br	Br	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Br	I	CF_3	Br	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Br	I	CF_3	Br	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Br	I	Cl	Cl	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Br	I	Cl	Cl	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Br	I	Cl	Br	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Br	I	Cl	Br	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Br	I	Br	Cl	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Br	I	Br	Cl	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Br	I	Br	Cl	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Br	I	Br	Cl	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Br	I	Br	Br	Me	Br	F	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	Br	Br	Cl	Et	Br	I	Br	Br	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Br	CF_3	CF_3	Cl	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Br	CF_3	CF_3	Cl	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Br	CF_3	CF_3	Br	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Br	CF_3	CF_3	Br	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Br	CF_3	Cl	Cl	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Br	CF_3	Cl	Cl	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Br	CF_3	Cl	Br	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Br	CF_3	Cl	Br	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Br	CF_3	Br	Cl	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Br	CF_3	Br	Cl	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	Br	Br	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	Br	Br	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	Br	CF_3	Cl	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	Br	CF_3	Cl	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	Br	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	Br	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	Br	CF_3	Br	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	Br	CF_3	Br	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Br	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Br	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	Br	Cl	Cl	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	Br	Cl	Cl	Et	Br	Cl	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	Br	Cl	Br	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	Br	Cl	Br	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	Br	Cl	Br	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	Br	Cl	Br	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	CH_3	CF_3	Br	Cl	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	CH_3	CF_3	Br	Cl	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Br	*n*-Pr	CH_3	Cl	Cl	Cl	*t*-Bu	CH_3	CF_3	Br	Br
Et	CH_3	CF_3	Br	Br	*n*-Bu	CH_3	Cl	Cl	Cl	*i*-Bu	CH_3	Cl	Cl	Cl
i-Pr	CH_3	CF_3	Br	Br	*s*-Bu	CH_3	Cl	Cl	Cl					

Table 12



R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	H	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	H	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	H	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	H	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	H	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	H	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	H	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	H	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	H	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	H	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	F	Cl	Br	Me	Cl	H	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	F	Cl	Br	Et	Cl	H	CF_3	Cl

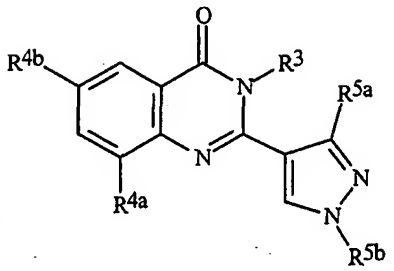
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	F	Br	Cl	Me	Cl	H	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	F	Br	Cl	Et	Cl	H	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Cl	H	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Cl	H	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	F	Br	Br	Me	Cl	H	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	F	Br	Br	Et	Cl	H	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
t-Bu	CH_3	H	Br	Br	*t*-Bu	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Cl	Br	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Cl	Br	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	F	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Cl	Br	Br	Cl
Et	CH_3	F	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Cl	Br	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	F	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Cl	Br	Br	Br
Et	CH_3	F	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Cl	Br	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	F	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Cl	I	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	Cl	Cl	Br	Cl	Me	Cl	I	CF_3	Br
Et	CH_3	F	Br	Cl	Et	Cl	Cl	Br	Cl	Et	Cl	I	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	Cl	Cl	Br	Cl	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	Cl	Cl	Br	Cl	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	F	Br	Br	Me	Cl	Cl	Br	Br	Me	Cl	I	Cl	Cl
Et	CH_3	F	Br	Br	Et	Cl	Cl	Br	Br	Et	Cl	I	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	Cl	Cl	Br	Br	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	Cl	Cl	Br	Br	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	Cl	CF_3	Cl	Me	Cl	Br	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	Cl	CF_3	Cl	Et	Cl	Br	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	Cl	CF_3	Br	Me	Cl	Br	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	Cl	CF_3	Br	Et	Cl	Br	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	Br	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	Cl	Cl	Cl	Me	Cl	Br	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	Cl	Cl	Cl	Et	Cl	Br	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	Br	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	Cl	Cl	Br	Me	Br	Br	Br	Cl	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	Cl	Cl	Br	Et	Br	Br	Br	Cl	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Br	Br	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Br	Br	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	Cl	Br	Cl	Me	Br	Br	Br	Br	Me	Cl	CF_3	CF_3	Br
Et	CH_3	Cl	Br	Cl	Et	Br	Br	Br	Br	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Br	Br	Br	Br	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Br	Br	Br	Br	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	Cl	Br	Br	Me	Br	I	CF_3	Cl	Me	Cl	CF_3	Cl	Cl
Et	CH_3	Cl	Br	Br	Et	Br	I	CF_3	Cl	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	Cl	Br	Br	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	Cl	Br	Br	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Br	I	CF_3	Br	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Br	I	CF_3	Br	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Br	I	Cl	Cl	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Br	I	Cl	Cl	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Br	I	Cl	Br	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Br	I	Cl	Br	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Br	I	Br	Cl	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Br	I	Br	Cl	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Br	I	Br	Cl	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Br	I	Br	Cl	*i*-Bu	Cl	Cl	Cl	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	Br	Br	Cl	Me	Br	I	Br	Br	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Br	I	Br	Br	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Br	CF_3	CF_3	Cl	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Br	CF_3	CF_3	Cl	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Br	CF_3	CF_3	Br	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Br	CF_3	CF_3	Br	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Br	CF_3	Cl	Cl	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Br	CF_3	Cl	Cl	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Br	CF_3	Cl	Br	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Br	CF_3	Cl	Br	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Br	CF_3	Br	Cl	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Br	CF_3	Br	Cl	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	Br	Br	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	Br	Br	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	Br	CF_3	Cl	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	Br	CF_3	Cl	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	Br	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	Br	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	Br	CF_3	Br	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	Br	CF_3	Br	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Br	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Br	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	Br	Cl	Cl	Me	Br	Cl	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	CF_3	CF_3	Br
i-Pr	CH_3	CF_3	CF_3	Br
t-Bu	CH_3	CF_3	CF_3	Br
Me	CH_3	CF_3	Cl	Cl
Et	CH_3	CF_3	Cl	Cl
i-Pr	CH_3	CF_3	Cl	Cl
t-Bu	CH_3	CF_3	Cl	Cl
Me	CH_3	CF_3	Cl	Br
Et	CH_3	CF_3	Cl	Br
i-Pr	CH_3	CF_3	Cl	Br
t-Bu	CH_3	CF_3	Cl	Br
Me	CH_3	CF_3	Br	Br
Et	CH_3	CF_3	Br	Br
i-Pr	CH_3	CF_3	Br	Br
Et	Br	Br	Cl	Cl
i-Pr	Br	Br	Cl	Cl
t-Bu	Br	Br	Cl	Cl
Me	Br	Br	Cl	Br
Et	Br	Br	Cl	Br
i-Pr	Br	Br	Cl	Br
t-Bu	Br	Br	Cl	Br
Me	CH_3	CF_3	Br	Cl
Et	CH_3	CF_3	Br	Cl
i-Pr	CH_3	CF_3	Br	Cl
t-Bu	CH_3	CF_3	Br	Cl
n-Pr	CH_3	Cl	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl
Et	Br	Cl	Cl	Br
i-Pr	Br	Cl	Cl	Br
t-Bu	Br	Cl	Cl	Br
Me	Br	Cl	Br	Cl
Et	Br	Cl	Br	Cl
i-Pr	Br	Cl	Br	Cl
t-Bu	Br	Cl	Br	Cl
Me	Br	Cl	Br	Br
Et	Br	Cl	Br	Br
i-Pr	Br	Cl	Br	Br
t-Bu	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Br	Br
i-Bu	CH_3	Cl	Cl	Cl

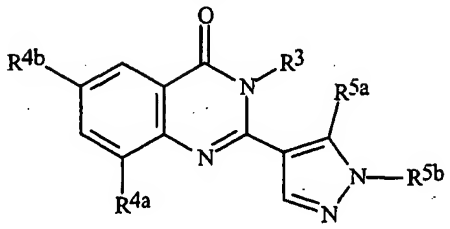
Table 13



R^{5b} is CHF_2				R^{5b} is CH_2CF_3				R^{5b} is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}
i-Pr	Me	H	Me	*i*-Pr	Me	H	Me	*i*-Pr	Me	H	Me
i-Pr	Cl	H	Me	*i*-Pr	Cl	H	Me	*i*-Pr	Cl	H	Me
i-Pr	Me	Cl	Me	*i*-Pr	Me	Cl	Me	*i*-Pr	Me	Cl	Me
i-Pr	Cl	Cl	Me	*i*-Pr	Cl	Cl	Me	*i*-Pr	Cl	Cl	Me
i-Pr	Me	Br	Me	*i*-Pr	Me	Br	Me	*i*-Pr	Me	Br	Me
i-Pr	Cl	Br	Me	*i*-Pr	Cl	Br	Me	*i*-Pr	Cl	Br	Me
t-Bu	Me	H	Me	*t*-Bu	Me	H	Me	*t*-Bu	Me	H	Me
t-Bu	Cl	H	Me	*t*-Bu	Cl	H	Me	*t*-Bu	Cl	H	Me
t-Bu	Me	Cl	Me	*t*-Bu	Me	Cl	Me	*t*-Bu	Me	Cl	Me
t-Bu	Cl	Cl	Me	*t*-Bu	Cl	Cl	Me	*t*-Bu	Cl	Cl	Me
t-Bu	Me	Br	Me	*t*-Bu	Me	Br	Me	*t*-Bu	Me	Br	Me
t-Bu	Cl	Br	Me	*t*-Bu	Cl	Br	Me	*t*-Bu	Cl	Br	Me

R^{5b} is CHF_2				R^{5b} is CH_2CF_3				R^{5b} is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}
Et	Me	H	Me	Et	Me	H	Me	Et	Me	H	Me
Et	Cl	H	Me	Et	Cl	H	Me	Et	Cl	H	Me
Et	Me	Cl	Me	Et	Me	Cl	Me	Et	Me	Cl	Me
Et	Cl	Cl	Me	Et	Cl	Cl	Me	Et	Cl	Cl	Me
Et	Me	Br	Me	Et	Me	Br	Me	Et	Me	Br	Me
Et	Cl	Br	Me	Et	Cl	Br	Me	Et	Cl	Br	Me
Me	Me	H	Me	Me	Me	H	Me	Me	Me	H	Me
Me	Cl	H	Me	Me	Cl	H	Me	Me	Cl	H	Me
Me	Me	Cl	Me	Me	Me	Cl	Me	Me	Me	Cl	Me
Me	Cl	Cl	Me	Me	Cl	Cl	Me	Me	Cl	Cl	Me
Me	Me	Br	Me	Me	Me	Br	Me	Me	Me	Br	Me
Me	Cl	Br	Me	Me	Cl	Br	Me	Me	Cl	Br	Me

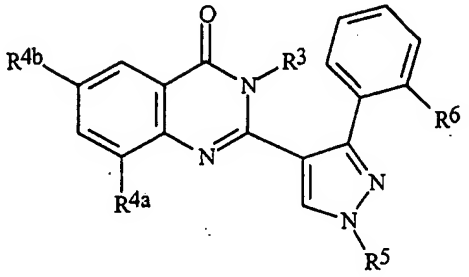
Table 14



R^{5b} is CHF_2				R^{5b} is CH_2CF_3				R^{5b} is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}
i-Pr	Me	H	Me	*i*-Pr	Me	H	Me	*i*-Pr	Me	H	Me
i-Pr	Cl	H	Me	*i*-Pr	Cl	H	Me	*i*-Pr	Cl	H	Me
i-Pr	Me	Cl	Me	*i*-Pr	Me	Cl	Me	*i*-Pr	Me	Cl	Me
i-Pr	Cl	Cl	Me	*i*-Pr	Cl	Cl	Me	*i*-Pr	Cl	Cl	Me
i-Pr	Me	Br	Me	*i*-Pr	Me	Br	Me	*i*-Pr	Me	Br	Me
i-Pr	Cl	Br	Me	*i*-Pr	Cl	Br	Me	*i*-Pr	Cl	Br	Me
t-Bu	Me	H	Me	*t*-Bu	Me	H	Me	*t*-Bu	Me	H	Me
t-Bu	Cl	H	Me	*t*-Bu	Cl	H	Me	*t*-Bu	Cl	H	Me
t-Bu	Me	Cl	Me	*t*-Bu	Me	Cl	Me	*t*-Bu	Me	Cl	Me
t-Bu	Cl	Cl	Me	*t*-Bu	Cl	Cl	Me	*t*-Bu	Cl	Cl	Me
t-Bu	Me	Br	Me	*t*-Bu	Me	Br	Me	*t*-Bu	Me	Br	Me
t-Bu	Cl	Br	Me	*t*-Bu	Cl	Br	Me	*t*-Bu	Cl	Br	Me
Et	Me	H	Me	Et	Me	H	Me	Et	Me	H	Me
Et	Cl	H	Me	Et	Cl	H	Me	Et	Cl	H	Me

R^{5b} is CHF_2				R^{5b} is CH_2CF_3				R^{5b} is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}	R^3	R^{4a}	R^{4b}	R^{5a}
Et	Me	Cl	Me	Et	Me	Cl	Me	Et	Me	Cl	Me
Et	Cl	Cl	Me	Et	Cl	Cl	Me	Et	Cl	Cl	Me
Et	Me	Br	Me	Et	Me	Br	Me	Et	Me	Br	Me
Et	Cl	Br	Me	Et	Cl	Br	Me	Et	Cl	Br	Me
Me	Me	H	Me	Me	Me	H	Me	Me	Me	H	Me
Me	Cl	H	Me	Me	Cl	H	Me	Me	Cl	H	Me
Me	Me	Cl	Me	Me	Me	Cl	Me	Me	Me	Cl	Me
Me	Cl	Cl	Me	Me	Cl	Cl	Me	Me	Cl	Cl	Me
Me	Me	Br	Me	Me	Me	Br	Me	Me	Me	Br	Me
Me	Cl	Br	Me	Me	Cl	Br	Me	Me	Cl	Br	Me

Table 15



R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	H	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	H	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	H	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	F	Cl	Me	CH_3	F	Cl	Me	CH_3	F	Cl
Et	CH_3	F	Cl	Et	CH_3	F	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	F	Br	Me	CH_3	F	Br	Me	CH_3	F	Br
Et	CH_3	F	Br	Et	CH_3	F	Br	Et	CH_3	F	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br

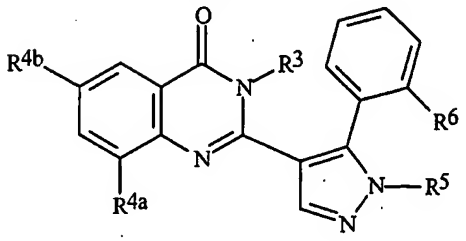
R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br
Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl
Me	CH_3	Cl	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br
Et	CH_3	Cl	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	Br	Cl	Me	CH_3	Br	Cl	Me	CH_3	Br	Cl
Et	CH_3	Br	Cl	Et	CH_3	Br	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	Br	Br	Me	CH_3	Br	Br	Me	CH_3	Br	Br
Et	CH_3	Br	Br	Et	CH_3	Br	Br	Et	CH_3	Br	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	I	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	I	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	I	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	F	Br	Me	Cl	H	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	F	Br	Et	Cl	H	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	H	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	H	Br
Me	Cl	F	Cl	Me	Cl	F	Cl	Me	Cl	H	Cl
Et	Cl	F	Cl	Et	Cl	F	Cl	Et	Cl	H	Cl
i-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	F	Br	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	F	Br	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	F	Br	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	F	Br	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	Cl	Cl	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	Cl	Cl	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl
Me	Cl	H	Br	Me	Cl	H	Br	Me	Cl	F	Br
Et	Cl	H	Br	Et	Cl	H	Br	Et	Cl	F	Br
i-Pr	Cl	H	Br	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Br	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	F	Br
Me	Cl	H	Cl	Me	Cl	H	Cl	Me	Cl	F	Cl
Et	Cl	H	Cl	Et	Cl	H	Cl	Et	Cl	F	Cl
i-Pr	Cl	H	Cl	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	H	Cl	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	Br	Br	Me	Cl	Br	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Br	Et	Cl	Br	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Br	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Br	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	Br	Cl	Me	Cl	I	Cl	Me	Cl	CF_3	Cl
Et	Cl	Br	Cl	Et	Cl	I	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	I	Br	Me	Cl	I	Br	Me	Br	F	Cl
Et	Cl	I	Br	Et	Cl	I	Br	Et	Br	F	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	I	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	I	Br	*t*-Bu	Br	F	Cl
Me	Cl	I	Cl	Me	Cl	CF_3	Cl	Me	Br	F	Br
Et	Cl	I	Cl	Et	Cl	CF_3	Cl	Et	Br	F	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Br	F	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
t-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Br	F	Br
Me	Cl	CF_3	Br	Me	Cl	CF_3	Br	Me	Br	Cl	Cl
Et	Cl	CF_3	Br	Et	Cl	CF_3	Br	Et	Br	Cl	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	Cl	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	Cl	Cl
Me	Cl	CF_3	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	Cl	Br
Et	Cl	CF_3	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	Cl	Br
i-Pr	Cl	CF_3	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	Cl	Br
t-Bu	Cl	CF_3	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	Cl	Br
Me	Br	F	Cl	Me	Br	F	Cl	Me	Br	Br	Cl
Et	Br	F	Cl	Et	Br	F	Cl	Et	Br	Br	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Br	Cl
Me	Br	F	Br	Me	Br	F	Br	Me	Br	Br	Br
Et	Br	F	Br	Et	Br	F	Br	Et	Br	Br	Br
i-Pr	Br	F	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	F	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Br	Br
Me	Br	Cl	Cl	Me	Br	Cl	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Cl	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Cl	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Cl	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	I	Br
Me	Br	Br	Cl	Me	Br	Br	Cl	Me	Br	CF_3	Cl
Et	Br	Br	Cl	Et	Br	Br	Cl	Et	Br	CF_3	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	Br	Br	Me	Br	Br	Br	Me	Br	CF_3	Br
Et	Br	Br	Br	Et	Br	Br	Br	Et	Br	CF_3	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	CF_3	Br
Me	Br	I	Cl	Me	Br	I	Cl	Me	Cl	Cl	Br
Et	Br	I	Cl	Et	Br	I	Cl	Et	Cl	Cl	Br
i-Pr	Br	I	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Cl	Cl	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
t-Bu	Br	I	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Cl	Cl	Br
Me	Br	I	Br	Me	Br	I	Br	Me	Cl	Cl	Cl
Et	Br	I	Br	Et	Br	I	Br	Et	Cl	Cl	Cl
i-Pr	Br	I	Br	*i*-Pr	Br	I	Br	*i*-Pr	Cl	Cl	Cl
t-Bu	Br	I	Br	*t*-Bu	Br	I	Br	*t*-Bu	Cl	Cl	Cl

Table 16



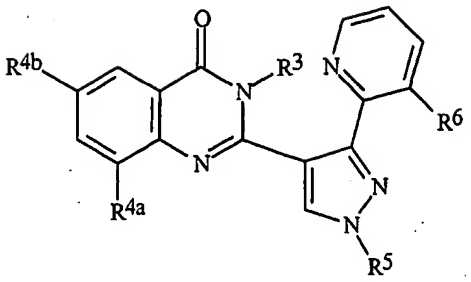
R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	H	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	H	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	H	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	F	Cl	Me	CH_3	F	Cl	Me	CH_3	F	Cl
Et	CH_3	F	Cl	Et	CH_3	F	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	F	Br	Me	CH_3	F	Br	Me	CH_3	F	Br
Et	CH_3	F	Br	Et	CH_3	F	Br	Et	CH_3	F	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br
Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl
Me	CH_3	Cl	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	CH_3	Cl	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	Br	Cl	Me	CH_3	Br	Cl	Me	CH_3	Br	Cl
Et	CH_3	Br	Cl	Et	CH_3	Br	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	Br	Br	Me	CH_3	Br	Br	Me	CH_3	Br	Br
Et	CH_3	Br	Br	Et	CH_3	Br	Br	Et	CH_3	Br	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	I	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	I	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	I	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	F	Br	Me	Cl	H	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	F	Br	Et	Cl	H	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	H	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	H	Br
Me	Cl	F	Cl	Me	Cl	F	Cl	Me	Cl	H	Cl
Et	Cl	F	Cl	Et	Cl	F	Cl	Et	Cl	H	Cl
i-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	F	Br	Me	Cl	Cl	Br	Me	Cl	I	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Cl	F	Br	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	F	Br	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	F	Br	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	Cl	Cl	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	Cl	Cl	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl
Me	Cl	H	Br	Me	Cl	H	Br	Me	Cl	F	Br
Et	Cl	H	Br	Et	Cl	H	Br	Et	Cl	F	Br
i-Pr	Cl	H	Br	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Br	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	F	Br
Me	Cl	H	Cl	Me	Cl	H	Cl	Me	Cl	F	Cl
Et	Cl	H	Cl	Et	Cl	H	Cl	Et	Cl	F	Cl
i-Pr	Cl	H	Cl	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	H	Cl	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	Br	Br	Me	Cl	Br	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Br	Et	Cl	Br	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Br	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Br	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	Br	Cl	Me	Cl	I	Cl	Me	Cl	CF_3	Cl
Et	Cl	Br	Cl	Et	Cl	I	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	I	Br	Me	Cl	I	Br	Me	Br	F	Cl
Et	Cl	I	Br	Et	Cl	I	Br	Et	Br	F	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	I	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	I	Br	*t*-Bu	Br	F	Cl
Me	Cl	I	Cl	Me	Cl	CF_3	Cl	Me	Br	F	Br
Et	Cl	I	Cl	Et	Cl	CF_3	Cl	Et	Br	F	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Br	F	Br
Me	Cl	CF_3	Br	Me	Cl	CF_3	Br	Me	Br	Cl	Cl
Et	Cl	CF_3	Br	Et	Cl	CF_3	Br	Et	Br	Cl	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	Cl	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	Cl	Cl
Me	Cl	CF_3	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	Cl	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Cl	CF_3	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	Cl	Br
i-Pr	Cl	CF_3	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	Cl	Br
t-Bu	Cl	CF_3	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	Cl	Br
Me	Br	F	Cl	Me	Br	F	Cl	Me	Br	Br	Cl
Et	Br	F	Cl	Et	Br	F	Cl	Et	Br	Br	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Br	Cl
Me	Br	F	Br	Me	Br	F	Br	Me	Br	Br	Br
Et	Br	F	Br	Et	Br	F	Br	Et	Br	Br	Br
i-Pr	Br	F	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	F	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Br	Br
Me	Br	Cl	Cl	Me	Br	Cl	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Cl	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Cl	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Cl	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	I	Br
Me	Br	Br	Cl	Me	Br	Br	Cl	Me	Br	CF_3	Cl
Et	Br	Br	Cl	Et	Br	Br	Cl	Et	Br	CF_3	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	Br	Br	Me	Br	Br	Br	Me	Br	CF_3	Br
Et	Br	Br	Br	Et	Br	Br	Br	Et	Br	CF_3	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	CF_3	Br
Me	Br	I	Cl	Me	Br	I	Cl	Me	Cl	Cl	Br
Et	Br	I	Cl	Et	Br	I	Cl	Et	Cl	Cl	Br
i-Pr	Br	I	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Cl	Cl	Br
t-Bu	Br	I	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Cl	Cl	Br
Me	Br	I	Br	Me	Br	I	Br	Me	Cl	Cl	Cl
Et	Br	I	Br	Et	Br	I	Br	Et	Cl	Cl	Cl
i-Pr	Br	I	Br	*i*-Pr	Br	I	Br	*i*-Pr	Cl	Cl	Cl
t-Bu	Br	I	Br	*t*-Bu	Br	I	Br	*t*-Bu	Cl	Cl	Cl

Table 17



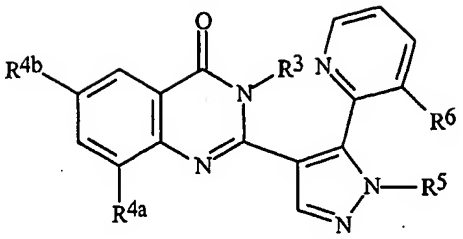
R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	Br	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	Br	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	Br	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	F	Cl	Me	CH_3	Br	Cl	Me	CH_3	I	Cl
Et	CH_3	F	Cl	Et	CH_3	Br	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	F	Br	Me	CH_3	Br	Br	Me	CH_3	I	Br
Et	CH_3	F	Br	Et	CH_3	Br	Br	Et	CH_3	I	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	Cl	Cl	Me	CH_3	F	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	Cl	Cl	Et	CH_3	F	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	Cl	Br	Me	CH_3	F	Br	Me	CH_3	CF_3	Br
Et	CH_3	Cl	Br	Et	CH_3	F	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	CF_3	Br
Me	CH_3	Br	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Br	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	Br	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br
Et	CH_3	Br	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	H	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	H	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	H	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	F	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	F	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	F	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	F	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	H	Br	Me	Cl	Cl	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	H	Br	Et	Cl	Cl	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Br
Me	Cl	I	Br	Me	Cl	H	Cl	Me	Cl	Cl	Cl
Et	Cl	I	Br	Et	Cl	H	Cl	Et	Cl	Cl	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	Cl	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	Cl	Cl
Me	Cl	I	Cl	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	I	Cl	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	H	Br	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	H	Br	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	Cl	H	Cl	Me	Cl	F	Br	Me	Cl	F	Br
Et	Cl	H	Cl	Et	Cl	F	Br	Et	Cl	F	Br
i-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	F	Br
Me	Cl	CF_3	Br	Me	Cl	F	Cl	Me	Cl	F	Cl
Et	Cl	CF_3	Br	Et	Cl	F	Cl	Et	Cl	F	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	CF_3	Cl	Me	Cl	Br	Br	Me	Cl	H	Br
Et	Cl	CF_3	Cl	Et	Cl	Br	Br	Et	Cl	H	Br
i-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	H	Br
t-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	H	Br
Me	Cl	Br	Br	Me	Cl	I	Cl	Me	Cl	H	Cl
Et	Cl	Br	Br	Et	Cl	I	Cl	Et	Cl	H	Cl
i-Pr	Cl	Br	Br	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	Br	Br	*t*-Bu	Cl	I	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	Br	Cl	Me	Cl	I	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Cl	Et	Cl	I	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	F	Br	Me	Cl	CF_3	Cl	Me	Cl	CF_3	Cl
Et	Cl	F	Br	Et	Cl	CF_3	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	F	Br	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	F	Br	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	Cl	Cl	Me	Cl	CF_3	Br	Me	Br	F	Cl
Et	Cl	Cl	Cl	Et	Cl	CF_3	Br	Et	Br	F	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	F	Cl
Me	Cl	F	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	F	Br
Et	Cl	F	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	F	Br
i-Pr	Cl	F	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	F	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	F	Br
Me	Br	Br	Cl	Me	Br	F	Cl	Me	Br	Cl	Cl
Et	Br	Br	Cl	Et	Br	F	Cl	Et	Br	Cl	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Cl	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Cl	Cl

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	Br	Br	Br	Me	Br	F	Br	Me	Br	Cl	Br
Et	Br	Br	Br	Et	Br	F	Br	Et	Br	Cl	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Cl	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Cl	Br
Me	Br	I	Cl	Me	Br	Cl	Cl	Me	Br	Br	Cl
Et	Br	I	Cl	Et	Br	Cl	Cl	Et	Br	Br	Cl
i-Pr	Br	I	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	I	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl
Me	Br	I	Br	Me	Br	Cl	Br	Me	Br	Br	Br
Et	Br	I	Br	Et	Br	Cl	Br	Et	Br	Br	Br
i-Pr	Br	I	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	I	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br
Me	Br	F	Cl	Me	Br	I	Cl	Me	Br	CF_3	Cl
Et	Br	F	Cl	Et	Br	I	Cl	Et	Br	CF_3	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	F	Br	Me	Br	I	Br	Me	Br	CF_3	Br
Et	Br	F	Br	Et	Br	I	Br	Et	Br	CF_3	Br
i-Pr	Br	F	Br	*i*-Pr	Br	I	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	F	Br	*t*-Bu	Br	I	Br	*t*-Bu	Br	CF_3	Br
Me	Br	Cl	Cl	Me	Br	Br	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Br	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Br	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Br	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	I	Br

Table 18



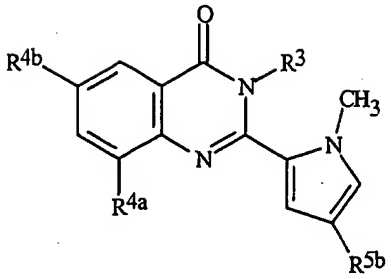
R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	Br	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	Br	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	Br	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	F	Cl	Me	CH_3	Br	Cl	Me	CH_3	I	Cl
Et	CH_3	F	Cl	Et	CH_3	Br	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	F	Br	Me	CH_3	Br	Br	Me	CH_3	I	Br
Et	CH_3	F	Br	Et	CH_3	Br	Br	Et	CH_3	I	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	Cl	Cl	Me	CH_3	F	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	Cl	Cl	Et	CH_3	F	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	Cl	Br	Me	CH_3	F	Br	Me	CH_3	CF_3	Br
Et	CH_3	Cl	Br	Et	CH_3	F	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	CF_3	Br
Me	CH_3	Br	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Br	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl
Me	CH_3	Br	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	CH_3	Br	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	H	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	H	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	H	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	F	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	F	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	F	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	F	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	H	Br	Me	Cl	Cl	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	H	Br	Et	Cl	Cl	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Br
Me	Cl	I	Br	Me	Cl	H	Cl	Me	Cl	Cl	Cl
Et	Cl	I	Br	Et	Cl	H	Cl	Et	Cl	Cl	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	Cl	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	Cl	Cl
Me	Cl	I	Cl	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	I	Cl	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	H	Br	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	H	Br	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl
Me	Cl	H	Cl	Me	Cl	F	Br	Me	Cl	F	Br

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Cl	H	Cl	Et	Cl	F	Br	Et	Cl	F	Br
i-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	F	Br
Me	Cl	CF_3	Br	Me	Cl	F	Cl	Me	Cl	F	Cl
Et	Cl	CF_3	Br	Et	Cl	F	Cl	Et	Cl	F	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	CF_3	Cl	Me	Cl	Br	Br	Me	Cl	H	Br
Et	Cl	CF_3	Cl	Et	Cl	Br	Br	Et	Cl	H	Br
i-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	H	Br
t-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	H	Br
Me	Cl	Br	Br	Me	Cl	I	Cl	Me	Cl	H	Cl
Et	Cl	Br	Br	Et	Cl	I	Cl	Et	Cl	H	Cl
i-Pr	Cl	Br	Br	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	Br	Br	*t*-Bu	Cl	I	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	Br	Cl	Me	Cl	I	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Cl	Et	Cl	I	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	F	Br	Me	Cl	CF_3	Cl	Me	Cl	CF_3	Cl
Et	Cl	F	Br	Et	Cl	CF_3	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	F	Br	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	F	Br	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	Cl	Cl	Me	Cl	CF_3	Br	Me	Br	F	Cl
Et	Cl	Cl	Cl	Et	Cl	CF_3	Br	Et	Br	F	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	F	Cl
Me	Cl	F	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	F	Br
Et	Cl	F	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	F	Br
i-Pr	Cl	F	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	F	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	F	Br
Me	Br	Br	Cl	Me	Br	F	Cl	Me	Br	Cl	Cl
Et	Br	Br	Cl	Et	Br	F	Cl	Et	Br	Cl	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Cl	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Cl	Cl
Me	Br	Br	Br	Me	Br	F	Br	Me	Br	Cl	Br

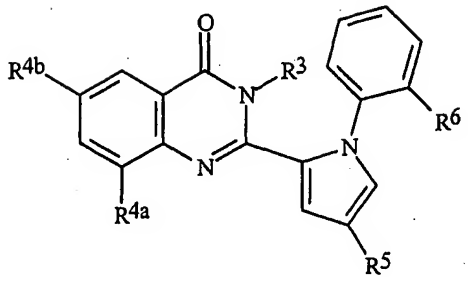
R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Br	Br	Br	Et	Br	F	Br	Et	Br	Cl	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Cl	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Cl	Br
Me	Br	I	Cl	Me	Br	Cl	Cl	Me	Br	Br	Cl
Et	Br	I	Cl	Et	Br	Cl	Cl	Et	Br	Br	Cl
i-Pr	Br	I	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	I	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl
Me	Br	I	Br	Me	Br	Cl	Br	Me	Br	Br	Br
Et	Br	I	Br	Et	Br	Cl	Br	Et	Br	Br	Br
i-Pr	Br	I	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	I	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br
Me	Br	F	Cl	Me	Br	I	Cl	Me	Br	CF_3	Cl
Et	Br	F	Cl	Et	Br	I	Cl	Et	Br	CF_3	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	F	Br	Me	Br	I	Br	Me	Br	CF_3	Br
Et	Br	F	Br	Et	Br	I	Br	Et	Br	CF_3	Br
i-Pr	Br	F	Br	*i*-Pr	Br	I	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	F	Br	*t*-Bu	Br	I	Br	*t*-Bu	Br	CF_3	Br
Me	Br	Cl	Cl	Me	Br	Br	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Br	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Br	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Br	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	I	Br

Table 19



R^{5b} is Cl			R^{5b} is CF_3			R^{5b} is OCF_3			R^{5b} is $CF(CF_3)_2$		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

Table 20



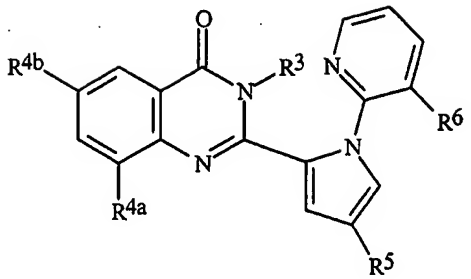
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	H	Cl	Br	Me	Cl	Br	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	H	Cl	Br	Et	Cl	Br	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	H	Br	Cl	Me	Cl	Br	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	H	Br	Cl	Et	Cl	Br	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	H	Br	Cl	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	H	Br	Cl	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	H	Br	Br	Me	Cl	Br	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	H	Br	Br	Et	Cl	Br	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	H	Br	Br	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	H	Br	Br	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	H	CF_3	Cl	Me	Cl	I	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	H	CF_3	Cl	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	H	CF_3	Br	Me	Cl	I	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	H	CF_3	Br	Et	Cl	I	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	H	CF_3	Br	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	H	CF_3	Br	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	H	Cl	Cl	Me	Cl	I	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	H	Cl	Cl	Et	Cl	I	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	CH_3	Cl	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	CH_3	Cl	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	F	CF_3	Br	Me	CH_3	Cl	CF_3	Br	Me	Cl	I	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	F	CF_3	Br	Et	CH_3	Cl	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	F	Cl	Cl	Me	CH_3	Cl	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	F	Cl	Cl	Et	CH_3	Cl	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	F	Cl	Br	Me	CH_3	Cl	Cl	Br	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	CH_3	Cl	Cl	Br	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	CH_3	Cl	Br	Cl	Me	Cl	CF_3	CF_3	Br
Et	CH_3	F	Br	Cl	Et	CH_3	Cl	Br	Cl	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	F	Br	Br	Me	CH_3	Cl	Br	Br	Me	Cl	CF_3	Cl	Cl
Et	CH_3	F	Br	Br	Et	CH_3	Cl	Br	Br	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	CH_3	Cl	Br	Br	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	CH_3	Cl	Br	Br	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Cl	F	Cl	Br	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Cl	F	Cl	Br	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Cl	F	Br	Cl	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Cl	F	Br	Cl	Et	Br	F	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Cl	F	Br	Br	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Cl	F	Br	Br	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Cl	F	Br	Br	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	CF_3	Cl	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	CF_3	Cl	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	CF_3	CF_3	Br	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	CF_3	CF_3	Br	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	CF_3	Cl	Cl	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	CF_3	Cl	Cl	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	CF_3	Cl	Br	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	CF_3	Cl	Br	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	Cl	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	CF_3	Br	Cl	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	CF_3	Br	Cl	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	Br	CF_3	Br	Br	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	Br	CF_3	Br	Br	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Cl	Me	Br	I	CF_3	Cl	Me	Br	Br	CF_3	Cl
Et	CH_3	CF_3	Br	Cl	Et	Br	I	CF_3	Cl	Et	Br	Br	CF_3	Cl
i-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Cl
t-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Cl
Me	CH_3	CF_3	Br	Br	Me	Br	I	CF_3	Br	Me	Br	Br	CF_3	Br
Et	CH_3	CF_3	Br	Br	Et	Br	I	CF_3	Br	Et	Br	Br	CF_3	Br
i-Pr	CH_3	CF_3	Br	Br	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Br	Br	CF_3	Br
t-Bu	CH_3	CF_3	Br	Br	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Br	Br	CF_3	Br
n-Pr	CH_3	Cl	Cl	Cl	Me	Br	I	Cl	Cl	Me	Br	Br	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl	Et	Br	I	Cl	Cl	Et	Br	Br	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Br	Br	Cl	Cl
i-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Br	Br	Cl	Cl
Me	Cl	Cl	Br	Cl	Me	Br	I	Cl	Br	Me	Br	Br	Cl	Br
Et	Cl	Cl	Br	Cl	Et	Br	I	Cl	Br	Et	Br	Br	Cl	Br
i-Pr	Cl	Cl	Br	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Br	Br	Cl	Br
t-Bu	Cl	Cl	Br	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Br	Br	Cl	Br
Me	Cl	Cl	Br	Br	Me	Br	I	Br	Cl	Me	Br	Br	Br	Cl
Et	Cl	Cl	Br	Br	Et	Br	I	Br	Cl	Et	Br	Br	Br	Cl
i-Pr	Cl	Cl	Br	Br	*i*-Pr	Br	I	Br	Cl	*i*-Pr	Br	Br	Br	Cl
t-Bu	Cl	Cl	Br	Br	*t*-Bu	Br	I	Br	Cl	*t*-Bu	Br	Br	Br	Cl
Me	Cl	Br	CF_3	Cl	Me	Br	I	Br	Br	Me	Br	Br	Br	Br
Et	Cl	Br	CF_3	Cl	Et	Br	I	Br	Br	Et	Br	Br	Br	Br
i-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	Br	Br	Br
t-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	Br	Br	Br
Me	Cl	Br	CF_3	Br	Me	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	CF_3	Br
Et	Cl	Br	CF_3	Br	Et	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl
i-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	Br	Cl	Cl					

Table 21



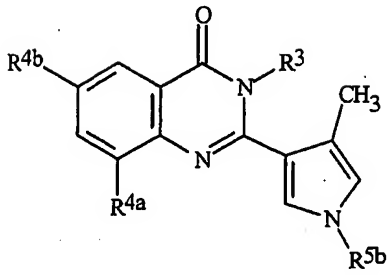
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	H	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	H	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	H	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	H	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	H	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	H	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	H	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	H	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	H	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	H	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	F	Cl	Br	Me	Cl	H	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	F	Cl	Br	Et	Cl	H	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	F	Br	Cl	Me	Cl	H	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	F	Br	Cl	Et	Cl	H	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Cl	H	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Cl	H	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	F	Br	Br	Me	Cl	H	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	F	Br	Br	Et	Cl	H	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
t-Bu	CH_3	H	Br	Br	*t*-Bu	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Cl	Br	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Cl	Br	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	F	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Cl	Br	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	F	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Cl	Br	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	F	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Cl	Br	Br	Br
Et	CH_3	F	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Cl	Br	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	F	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Cl	I	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	Cl	Cl	Br	Cl	Me	Cl	I	CF_3	Br
Et	CH_3	F	Br	Cl	Et	Cl	Cl	Br	Cl	Et	Cl	I	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	Cl	Cl	Br	Cl	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	Cl	Cl	Br	Cl	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	F	Br	Br	Me	Cl	Cl	Br	Br	Me	Cl	I	Cl	Cl
Et	CH_3	F	Br	Br	Et	Cl	Cl	Br	Br	Et	Cl	I	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	Cl	Cl	Br	Br	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	Cl	Cl	Br	Br	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	Cl	CF_3	Cl	Me	Cl	Br	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	Cl	CF_3	Cl	Et	Cl	Br	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	Cl	CF_3	Br	Me	Cl	Br	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	Cl	CF_3	Br	Et	Cl	Br	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	Br	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	Cl	Cl	Cl	Me	Cl	Br	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	Cl	Cl	Cl	Et	Cl	Br	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	Br	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	Cl	Cl	Br	Me	Br	Br	Br	Cl	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	Cl	Cl	Br	Et	Br	Br	Br	Cl	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Br	Br	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Br	Br	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	Cl	Br	Cl	Me	Br	Br	Br	Br	Me	Cl	CF_3	CF_3	Br
Et	CH_3	Cl	Br	Cl	Et	Br	Br	Br	Br	Et	Cl	CF_3	CF_3	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Br	Br	Br	Br	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Br	Br	Br	Br	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	Cl	Br	Br	Me	Br	I	CF_3	Cl	Me	Cl	CF_3	Cl	Cl
Et	CH_3	Cl	Br	Br	Et	Br	I	CF_3	Cl	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	Cl	Br	Br	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	Cl	Br	Br	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Br	I	CF_3	Br	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Br	I	CF_3	Br	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Br	I	Cl	Cl	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Br	I	Cl	Cl	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Br	I	Cl	Br	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Br	I	Cl	Br	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Br	I	Br	Cl	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Br	I	Br	Cl	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Br	I	Br	Cl	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Br	I	Br	Cl	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Br	I	Br	Br	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Br	I	Br	Br	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Br	CF_3	CF_3	Cl	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Br	CF_3	CF_3	Cl	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Br	CF_3	CF_3	Br	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Br	CF_3	CF_3	Br	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Br	CF_3	Cl	Cl	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Br	CF_3	Cl	Cl	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	F	Cl	Br

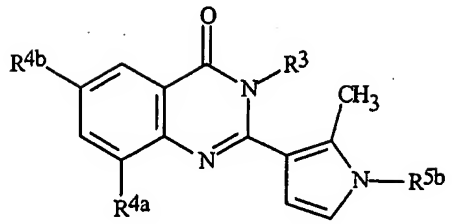
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Br	CF_3	Cl	Br	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Br	CF_3	Cl	Br	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Br	CF_3	Br	Cl	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Br	CF_3	Br	Cl	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	Br	Br	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	Br	Br	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	Br	CF_3	Cl	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	Br	CF_3	Cl	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	Br	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	Br	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	Br	CF_3	Br	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	Br	CF_3	Br	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Br	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Br	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	Br	Cl	Cl	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	Br	Cl	Cl	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	Br	Cl	Br	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	Br	Cl	Br	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	Br	Cl	Br	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	Br	Cl	Br	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	CH_3	CF_3	Br	Cl	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	CH_3	CF_3	Br	Cl	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Br	*n*-Pr	CH_3	Cl	Cl	Cl	*t*-Bu	CH_3	CF_3	Br	Br
Et	CH_3	CF_3	Br	Br	*n*-Bu	CH_3	Cl	Cl	Cl	*i*-Bu	CH_3	Cl	Cl	Cl
i-Pr	CH_3	CF_3	Br	Br	*s*-Bu	CH_3	Cl	Cl	Cl					

Table 22



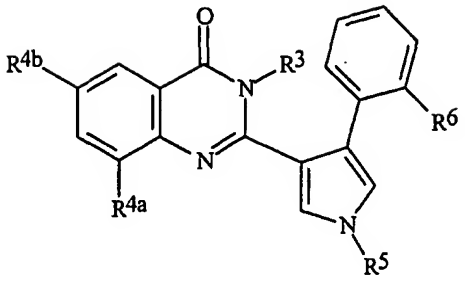
R^{5b} is CHF_2			R^{5b} is CF_3			R^{5b} is CH_2CF_3			R^{5b} is CF_2CHF_2		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

Table 23



R^{5b} is CHF_2			R^{5b} is CF_3			R^{5b} is CH_2CF_3			R^{5b} is CF_2CHF_2		
R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}	R^3	R^{4a}	R^{4b}
i-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H	*i*-Pr	Me	H
i-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H	*i*-Pr	Cl	H
i-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl	*i*-Pr	Me	Cl
i-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl	*i*-Pr	Cl	Cl
i-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br	*i*-Pr	Me	Br
i-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br	*i*-Pr	Cl	Br
t-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H	*t*-Bu	Me	H
t-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H	*t*-Bu	Cl	H
t-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl	*t*-Bu	Me	Cl
t-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl	*t*-Bu	Cl	Cl
t-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br	*t*-Bu	Me	Br
t-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br	*t*-Bu	Cl	Br
Et	Me	H	Et	Me	H	Et	Me	H	Et	Me	H
Et	Cl	H	Et	Cl	H	Et	Cl	H	Et	Cl	H
Et	Me	Cl	Et	Me	Cl	Et	Me	Cl	Et	Me	Cl
Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl	Et	Cl	Cl
Et	Me	Br	Et	Me	Br	Et	Me	Br	Et	Me	Br
Et	Cl	Br	Et	Cl	Br	Et	Cl	Br	Et	Cl	Br
Me	Me	H	Me	Me	H	Me	Me	H	Me	Me	H
Me	Cl	H	Me	Cl	H	Me	Cl	H	Me	Cl	H
Me	Me	Cl	Me	Me	Cl	Me	Me	Cl	Me	Me	Cl
Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl	Me	Cl	Cl
Me	Me	Br	Me	Me	Br	Me	Me	Br	Me	Me	Br
Me	Cl	Br	Me	Cl	Br	Me	Cl	Br	Me	Cl	Br

Table 24



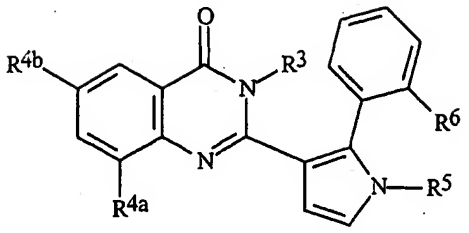
R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	H	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	H	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	H	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	F	Cl	Me	CH_3	F	Cl	Me	CH_3	F	Cl
Et	CH_3	F	Cl	Et	CH_3	F	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	F	Br	Me	CH_3	F	Br	Me	CH_3	F	Br
Et	CH_3	F	Br	Et	CH_3	F	Br	Et	CH_3	F	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br
Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl
Me	CH_3	Cl	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br
Et	CH_3	Cl	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	Br	Cl	Me	CH_3	Br	Cl	Me	CH_3	Br	Cl
Et	CH_3	Br	Cl	Et	CH_3	Br	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	Br	Br	Me	CH_3	Br	Br	Me	CH_3	Br	Br
Et	CH_3	Br	Br	Et	CH_3	Br	Br	Et	CH_3	Br	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	I	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	I	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	I	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	F	Br	Me	Cl	H	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	F	Br	Et	Cl	H	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	H	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	H	Br
Me	Cl	F	Cl	Me	Cl	F	Cl	Me	Cl	H	Cl
Et	Cl	F	Cl	Et	Cl	F	Cl	Et	Cl	H	Cl
i-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	F	Br	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	F	Br	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	F	Br	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	F	Br	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	Cl	Cl	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	Cl	Cl	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	Cl	H	Br	Me	Cl	H	Br	Me	Cl	F	Br
Et	Cl	H	Br	Et	Cl	H	Br	Et	Cl	F	Br
i-Pr	Cl	H	Br	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Br	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	F	Br
Me	Cl	H	Cl	Me	Cl	H	Cl	Me	Cl	F	Cl
Et	Cl	H	Cl	Et	Cl	H	Cl	Et	Cl	F	Cl
i-Pr	Cl	H	Cl	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	H	Cl	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	Br	Br	Me	Cl	Br	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Br	Et	Cl	Br	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Br	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Br	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	Br	Cl	Me	Cl	I	Cl	Me	Cl	CF_3	Cl
Et	Cl	Br	Cl	Et	Cl	I	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	I	Br	Me	Cl	I	Br	Me	Br	F	Cl
Et	Cl	I	Br	Et	Cl	I	Br	Et	Br	F	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	I	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	I	Br	*t*-Bu	Br	F	Cl
Me	Cl	I	Cl	Me	Cl	CF_3	Cl	Me	Br	F	Br
Et	Cl	I	Cl	Et	Cl	CF_3	Cl	Et	Br	F	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Br	F	Br
Me	Cl	CF_3	Br	Me	Cl	CF_3	Br	Me	Br	Cl	Cl
Et	Cl	CF_3	Br	Et	Cl	CF_3	Br	Et	Br	Cl	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	Cl	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	Cl	Cl
Me	Cl	CF_3	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	Cl	Br
Et	Cl	CF_3	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	Cl	Br
i-Pr	Cl	CF_3	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	Cl	Br
t-Bu	Cl	CF_3	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	Cl	Br
Me	Br	F	Cl	Me	Br	F	Cl	Me	Br	Br	Cl
Et	Br	F	Cl	Et	Br	F	Cl	Et	Br	Br	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Br	Cl

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	Br	F	Br	Me	Br	F	Br	Me	Br	Br	Br
Et	Br	F	Br	Et	Br	F	Br	Et	Br	Br	Br
i-Pr	Br	F	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	F	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Br	Br
Me	Br	Cl	Cl	Me	Br	Cl	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Cl	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Cl	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Cl	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	I	Br
Me	Br	Br	Cl	Me	Br	Br	Cl	Me	Br	CF_3	Cl
Et	Br	Br	Cl	Et	Br	Br	Cl	Et	Br	CF_3	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	Br	Br	Me	Br	Br	Br	Me	Br	CF_3	Br
Et	Br	Br	Br	Et	Br	Br	Br	Et	Br	CF_3	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	CF_3	Br
Me	Br	I	Cl	Me	Br	I	Cl	Me	Cl	Cl	Br
Et	Br	I	Cl	Et	Br	I	Cl	Et	Cl	Cl	Br
i-Pr	Br	I	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Cl	Cl	Br
t-Bu	Br	I	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Cl	Cl	Br
Me	Br	I	Br	Me	Br	I	Br	Me	Cl	Cl	Cl
Et	Br	I	Br	Et	Br	I	Br	Et	Cl	Cl	Cl
i-Pr	Br	I	Br	*i*-Pr	Br	I	Br	*i*-Pr	Cl	Cl	Cl
t-Bu	Br	I	Br	*t*-Bu	Br	I	Br	*t*-Bu	Cl	Cl	Cl

Table 25



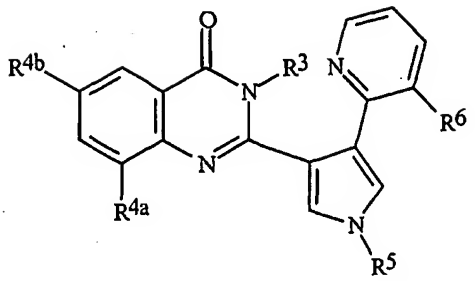
R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	H	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	H	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	H	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	F	Cl	Me	CH_3	F	Cl	Me	CH_3	F	Cl
Et	CH_3	F	Cl	Et	CH_3	F	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	F	Br	Me	CH_3	F	Br	Me	CH_3	F	Br
Et	CH_3	F	Br	Et	CH_3	F	Br	Et	CH_3	F	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	F	Br
Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl
Me	CH_3	Cl	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br
Et	CH_3	Cl	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	Br	Cl	Me	CH_3	Br	Cl	Me	CH_3	Br	Cl
Et	CH_3	Br	Cl	Et	CH_3	Br	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	Br	Br	Me	CH_3	Br	Br	Me	CH_3	Br	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	CH_3	Br	Br	Et	CH_3	Br	Br	Et	CH_3	Br	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	I	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	I	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	I	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	F	Br	Me	Cl	H	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	F	Br	Et	Cl	H	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	H	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	H	Br
Me	Cl	F	Cl	Me	Cl	F	Cl	Me	Cl	H	Cl
Et	Cl	F	Cl	Et	Cl	F	Cl	Et	Cl	H	Cl
i-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	F	Br	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	F	Br	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	F	Br	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	F	Br	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	Cl	Cl	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	Cl	Cl	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl
Me	Cl	H	Br	Me	Cl	H	Br	Me	Cl	F	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Cl	H	Br	Et	Cl	H	Br	Et	Cl	F	Br
i-Pr	Cl	H	Br	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Br	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	F	Br
Me	Cl	H	Cl	Me	Cl	H	Cl	Me	Cl	F	Cl
Et	Cl	H	Cl	Et	Cl	H	Cl	Et	Cl	F	Cl
i-Pr	Cl	H	Cl	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	H	Cl	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	Br	Br	Me	Cl	Br	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Br	Et	Cl	Br	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Br	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Br	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	Br	Cl	Me	Cl	I	Cl	Me	Cl	CF_3	Cl
Et	Cl	Br	Cl	Et	Cl	I	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	I	Br	Me	Cl	I	Br	Me	Br	F	Cl
Et	Cl	I	Br	Et	Cl	I	Br	Et	Br	F	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	I	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	I	Br	*t*-Bu	Br	F	Cl
Me	Cl	I	Cl	Me	Cl	CF_3	Cl	Me	Br	F	Br
Et	Cl	I	Cl	Et	Cl	CF_3	Cl	Et	Br	F	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Br	F	Br
Me	Cl	CF_3	Br	Me	Cl	CF_3	Br	Me	Br	Cl	Cl
Et	Cl	CF_3	Br	Et	Cl	CF_3	Br	Et	Br	Cl	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	Cl	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	Cl	Cl
Me	Cl	CF_3	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	Cl	Br
Et	Cl	CF_3	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	Cl	Br
i-Pr	Cl	CF_3	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	Cl	Br
t-Bu	Cl	CF_3	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	Cl	Br
Me	Br	F	Cl	Me	Br	F	Cl	Me	Br	Br	Cl
Et	Br	F	Cl	Et	Br	F	Cl	Et	Br	Br	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Br	Cl
Me	Br	F	Br	Me	Br	F	Br	Me	Br	Br	Br

R^5 is CHF_2				R^5 is CH_2CF_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Br	F	Br	Et	Br	F	Br	Et	Br	Br	Br
i-Pr	Br	F	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	F	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Br	Br
Me	Br	Cl	Cl	Me	Br	Cl	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Cl	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Cl	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Cl	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	I	Br
Me	Br	Br	Cl	Me	Br	Br	Cl	Me	Br	CF_3	Cl
Et	Br	Br	Cl	Et	Br	Br	Cl	Et	Br	CF_3	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	Br	Br	Me	Br	Br	Br	Me	Br	CF_3	Br
Et	Br	Br	Br	Et	Br	Br	Br	Et	Br	CF_3	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	CF_3	Br
Me	Br	I	Cl	Me	Br	I	Cl	Me	Cl	Cl	Br
Et	Br	I	Cl	Et	Br	I	Cl	Et	Cl	Cl	Br
i-Pr	Br	I	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Cl	Cl	Br
t-Bu	Br	I	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Cl	Cl	Br
Me	Br	I	Br	Me	Br	I	Br	Me	Cl	Cl	Cl
Et	Br	I	Br	Et	Br	I	Br	Et	Cl	Cl	Cl
i-Pr	Br	I	Br	*i*-Pr	Br	I	Br	*i*-Pr	Cl	Cl	Cl
t-Bu	Br	I	Br	*t*-Bu	Br	I	Br	*t*-Bu	Cl	Cl	Cl

Table 26



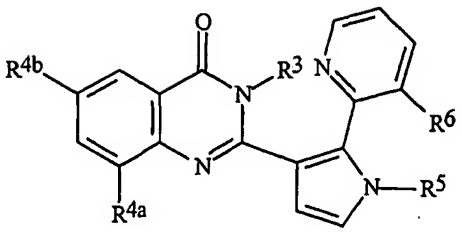
R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	Br	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	Br	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	Br	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	F	Cl	Me	CH_3	Br	Cl	Me	CH_3	I	Cl
Et	CH_3	F	Cl	Et	CH_3	Br	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	F	Br	Me	CH_3	Br	Br	Me	CH_3	I	Br
Et	CH_3	F	Br	Et	CH_3	Br	Br	Et	CH_3	I	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	Cl	Cl	Me	CH_3	F	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	Cl	Cl	Et	CH_3	F	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	Cl	Br	Me	CH_3	F	Br	Me	CH_3	CF_3	Br
Et	CH_3	Cl	Br	Et	CH_3	F	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	CF_3	Br
Me	CH_3	Br	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Br	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	Br	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br
Et	CH_3	Br	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	H	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	H	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	H	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	F	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	F	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	F	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	F	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	H	Br	Me	Cl	Cl	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	H	Br	Et	Cl	Cl	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Br
Me	Cl	I	Br	Me	Cl	H	Cl	Me	Cl	Cl	Cl
Et	Cl	I	Br	Et	Cl	H	Cl	Et	Cl	Cl	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	Cl	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	Cl	Cl
Me	Cl	I	Cl	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	I	Cl	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	H	Br	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	H	Br	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	Cl	H	Cl	Me	Cl	F	Br	Me	Cl	F	Br
Et	Cl	H	Cl	Et	Cl	F	Br	Et	Cl	F	Br
i-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	F	Br
Me	Cl	CF_3	Br	Me	Cl	F	Cl	Me	Cl	F	Cl
Et	Cl	CF_3	Br	Et	Cl	F	Cl	Et	Cl	F	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	CF_3	Cl	Me	Cl	Br	Br	Me	Cl	H	Br
Et	Cl	CF_3	Cl	Et	Cl	Br	Br	Et	Cl	H	Br
i-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	H	Br
t-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	H	Br
Me	Cl	Br	Br	Me	Cl	I	Cl	Me	Cl	H	Cl
Et	Cl	Br	Br	Et	Cl	I	Cl	Et	Cl	H	Cl
i-Pr	Cl	Br	Br	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	Br	Br	*t*-Bu	Cl	I	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	Br	Cl	Me	Cl	I	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Cl	Et	Cl	I	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	F	Br	Me	Cl	CF_3	Cl	Me	Cl	CF_3	Cl
Et	Cl	F	Br	Et	Cl	CF_3	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	F	Br	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	F	Br	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	Cl	Cl	Me	Cl	CF_3	Br	Me	Br	F	Cl
Et	Cl	Cl	Cl	Et	Cl	CF_3	Br	Et	Br	F	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	F	Cl
Me	Cl	F	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	F	Br
Et	Cl	F	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	F	Br
i-Pr	Cl	F	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	F	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	F	Br
Me	Br	Br	Cl	Me	Br	F	Cl	Me	Br	Cl	Cl
Et	Br	Br	Cl	Et	Br	F	Cl	Et	Br	Cl	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Cl	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Cl	Cl

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	Br	Br	Br	Me	Br	F	Br	Me	Br	Cl	Br
Et	Br	Br	Br	Et	Br	F	Br	Et	Br	Cl	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Cl	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Cl	Br
Me	Br	I	Cl	Me	Br	Cl	Cl	Me	Br	Br	Cl
Et	Br	I	Cl	Et	Br	Cl	Cl	Et	Br	Br	Cl
i-Pr	Br	I	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	I	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl
Me	Br	I	Br	Me	Br	Cl	Br	Me	Br	Br	Br
Et	Br	I	Br	Et	Br	Cl	Br	Et	Br	Br	Br
i-Pr	Br	I	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	I	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br
Me	Br	F	Cl	Me	Br	I	Cl	Me	Br	CF_3	Cl
Et	Br	F	Cl	Et	Br	I	Cl	Et	Br	CF_3	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	F	Br	Me	Br	I	Br	Me	Br	CF_3	Br
Et	Br	F	Br	Et	Br	I	Br	Et	Br	CF_3	Br
i-Pr	Br	F	Br	*i*-Pr	Br	I	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	F	Br	*t*-Bu	Br	I	Br	*t*-Bu	Br	CF_3	Br
Me	Br	Cl	Cl	Me	Br	Br	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Br	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Br	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Br	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	I	Br

Table 27



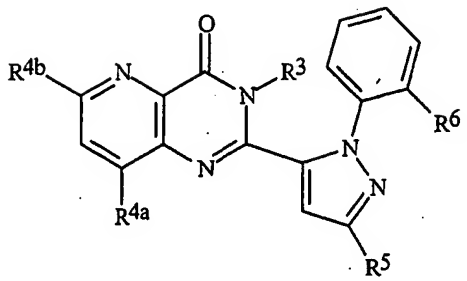
R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Me	CH_3	H	Cl	Me	CH_3	H	Cl	Me	CH_3	Br	Cl
Et	CH_3	H	Cl	Et	CH_3	H	Cl	Et	CH_3	Br	Cl
i-Pr	CH_3	H	Cl	*i*-Pr	CH_3	H	Cl	*i*-Pr	CH_3	Br	Cl
t-Bu	CH_3	H	Cl	*t*-Bu	CH_3	H	Cl	*t*-Bu	CH_3	Br	Cl
Me	CH_3	H	Br	Me	CH_3	H	Br	Me	CH_3	Br	Br
Et	CH_3	H	Br	Et	CH_3	H	Br	Et	CH_3	Br	Br
i-Pr	CH_3	H	Br	*i*-Pr	CH_3	H	Br	*i*-Pr	CH_3	Br	Br
t-Bu	CH_3	H	Br	*t*-Bu	CH_3	H	Br	*t*-Bu	CH_3	Br	Br
Me	CH_3	F	Cl	Me	CH_3	Br	Cl	Me	CH_3	I	Cl
Et	CH_3	F	Cl	Et	CH_3	Br	Cl	Et	CH_3	I	Cl
i-Pr	CH_3	F	Cl	*i*-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	I	Cl
t-Bu	CH_3	F	Cl	*t*-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	I	Cl
Me	CH_3	F	Br	Me	CH_3	Br	Br	Me	CH_3	I	Br
Et	CH_3	F	Br	Et	CH_3	Br	Br	Et	CH_3	I	Br
i-Pr	CH_3	F	Br	*i*-Pr	CH_3	Br	Br	*i*-Pr	CH_3	I	Br
t-Bu	CH_3	F	Br	*t*-Bu	CH_3	Br	Br	*t*-Bu	CH_3	I	Br
Me	CH_3	Cl	Cl	Me	CH_3	F	Cl	Me	CH_3	CF_3	Cl
Et	CH_3	Cl	Cl	Et	CH_3	F	Cl	Et	CH_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	F	Cl	*i*-Pr	CH_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	F	Cl	*t*-Bu	CH_3	CF_3	Cl
Me	CH_3	Cl	Br	Me	CH_3	F	Br	Me	CH_3	CF_3	Br
Et	CH_3	Cl	Br	Et	CH_3	F	Br	Et	CH_3	CF_3	Br
i-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	F	Br	*i*-Pr	CH_3	CF_3	Br
t-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	F	Br	*t*-Bu	CH_3	CF_3	Br
Me	CH_3	Br	Cl	Me	CH_3	Cl	Cl	Me	CH_3	Cl	Cl
Et	CH_3	Br	Cl	Et	CH_3	Cl	Cl	Et	CH_3	Cl	Cl
i-Pr	CH_3	Br	Cl	*i*-Pr	CH_3	Cl	Cl	*i*-Pr	CH_3	Cl	Cl
t-Bu	CH_3	Br	Cl	*t*-Bu	CH_3	Cl	Cl	*t*-Bu	CH_3	Cl	Cl
Me	CH_3	Br	Br	Me	CH_3	Cl	Br	Me	CH_3	Cl	Br

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	CH_3	Br	Br	Et	CH_3	Cl	Br	Et	CH_3	Cl	Br
i-Pr	CH_3	Br	Br	*i*-Pr	CH_3	Cl	Br	*i*-Pr	CH_3	Cl	Br
t-Bu	CH_3	Br	Br	*t*-Bu	CH_3	Cl	Br	*t*-Bu	CH_3	Cl	Br
Me	CH_3	I	Cl	Me	CH_3	I	Cl	Me	CH_3	H	Cl
Et	CH_3	I	Cl	Et	CH_3	I	Cl	Et	CH_3	H	Cl
i-Pr	CH_3	I	Cl	*i*-Pr	CH_3	I	Cl	*i*-Pr	CH_3	H	Cl
t-Bu	CH_3	I	Cl	*t*-Bu	CH_3	I	Cl	*t*-Bu	CH_3	H	Cl
Me	CH_3	I	Br	Me	CH_3	I	Br	Me	CH_3	H	Br
Et	CH_3	I	Br	Et	CH_3	I	Br	Et	CH_3	H	Br
i-Pr	CH_3	I	Br	*i*-Pr	CH_3	I	Br	*i*-Pr	CH_3	H	Br
t-Bu	CH_3	I	Br	*t*-Bu	CH_3	I	Br	*t*-Bu	CH_3	H	Br
Me	CH_3	CF_3	Cl	Me	CH_3	CF_3	Cl	Me	CH_3	F	Cl
Et	CH_3	CF_3	Cl	Et	CH_3	CF_3	Cl	Et	CH_3	F	Cl
i-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	CF_3	Cl	*i*-Pr	CH_3	F	Cl
t-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	CF_3	Cl	*t*-Bu	CH_3	F	Cl
Me	CH_3	CF_3	Br	Me	CH_3	CF_3	Br	Me	CH_3	F	Br
Et	CH_3	CF_3	Br	Et	CH_3	CF_3	Br	Et	CH_3	F	Br
i-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	CF_3	Br	*i*-Pr	CH_3	F	Br
t-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	CF_3	Br	*t*-Bu	CH_3	F	Br
n-Pr	CH_3	Cl	Cl	Me	Cl	H	Br	Me	Cl	Cl	Br
n-Bu	CH_3	Cl	Cl	Et	Cl	H	Br	Et	Cl	Cl	Br
s-Bu	CH_3	Cl	Cl	*i*-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Br
i-Bu	CH_3	Cl	Cl	*t*-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Br
Me	Cl	I	Br	Me	Cl	H	Cl	Me	Cl	Cl	Cl
Et	Cl	I	Br	Et	Cl	H	Cl	Et	Cl	Cl	Cl
i-Pr	Cl	I	Br	*i*-Pr	Cl	H	Cl	*i*-Pr	Cl	Cl	Cl
t-Bu	Cl	I	Br	*t*-Bu	Cl	H	Cl	*t*-Bu	Cl	Cl	Cl
Me	Cl	I	Cl	Me	Cl	Cl	Br	Me	Cl	I	Br
Et	Cl	I	Cl	Et	Cl	Cl	Br	Et	Cl	I	Br
i-Pr	Cl	I	Cl	*i*-Pr	Cl	Cl	Br	*i*-Pr	Cl	I	Br
t-Bu	Cl	I	Cl	*t*-Bu	Cl	Cl	Br	*t*-Bu	Cl	I	Br
Me	Cl	H	Br	Me	Cl	Cl	Cl	Me	Cl	I	Cl
Et	Cl	H	Br	Et	Cl	Cl	Cl	Et	Cl	I	Cl
i-Pr	Cl	H	Br	*i*-Pr	Cl	Cl	Cl	*i*-Pr	Cl	I	Cl
t-Bu	Cl	H	Br	*t*-Bu	Cl	Cl	Cl	*t*-Bu	Cl	I	Cl
Me	Cl	H	Cl	Me	Cl	F	Br	Me	Cl	F	Br

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Cl	H	Cl	Et	Cl	F	Br	Et	Cl	F	Br
i-Pr	Cl	H	Cl	*i*-Pr	Cl	F	Br	*i*-Pr	Cl	F	Br
t-Bu	Cl	H	Cl	*t*-Bu	Cl	F	Br	*t*-Bu	Cl	F	Br
Me	Cl	CF_3	Br	Me	Cl	F	Cl	Me	Cl	F	Cl
Et	Cl	CF_3	Br	Et	Cl	F	Cl	Et	Cl	F	Cl
i-Pr	Cl	CF_3	Br	*i*-Pr	Cl	F	Cl	*i*-Pr	Cl	F	Cl
t-Bu	Cl	CF_3	Br	*t*-Bu	Cl	F	Cl	*t*-Bu	Cl	F	Cl
Me	Cl	CF_3	Cl	Me	Cl	Br	Br	Me	Cl	H	Br
Et	Cl	CF_3	Cl	Et	Cl	Br	Br	Et	Cl	H	Br
i-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Br	*i*-Pr	Cl	H	Br
t-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Br	*t*-Bu	Cl	H	Br
Me	Cl	Br	Br	Me	Cl	I	Cl	Me	Cl	H	Cl
Et	Cl	Br	Br	Et	Cl	I	Cl	Et	Cl	H	Cl
i-Pr	Cl	Br	Br	*i*-Pr	Cl	I	Cl	*i*-Pr	Cl	H	Cl
t-Bu	Cl	Br	Br	*t*-Bu	Cl	I	Cl	*i*-Pr	Cl	H	Cl
Me	Cl	Br	Cl	Me	Cl	I	Br	Me	Cl	CF_3	Br
Et	Cl	Br	Cl	Et	Cl	I	Br	Et	Cl	CF_3	Br
i-Pr	Cl	Br	Cl	*i*-Pr	Cl	I	Br	*i*-Pr	Cl	CF_3	Br
t-Bu	Cl	Br	Cl	*t*-Bu	Cl	I	Br	*t*-Bu	Cl	CF_3	Br
Me	Cl	F	Br	Me	Cl	CF_3	Cl	Me	Cl	CF_3	Cl
Et	Cl	F	Br	Et	Cl	CF_3	Cl	Et	Cl	CF_3	Cl
i-Pr	Cl	F	Br	*i*-Pr	Cl	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl
t-Bu	Cl	F	Br	*t*-Bu	Cl	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl
Me	Cl	Cl	Cl	Me	Cl	CF_3	Br	Me	Br	F	Cl
Et	Cl	Cl	Cl	Et	Cl	CF_3	Br	Et	Br	F	Cl
i-Pr	Cl	Cl	Cl	*i*-Pr	Cl	CF_3	Br	*i*-Pr	Br	F	Cl
t-Bu	Cl	Cl	Cl	*t*-Bu	Cl	CF_3	Br	*t*-Bu	Br	F	Cl
Me	Cl	F	Cl	*n*-Pr	Cl	Cl	Cl	Me	Br	F	Br
Et	Cl	F	Cl	*n*-Bu	Cl	Cl	Cl	Et	Br	F	Br
i-Pr	Cl	F	Cl	*s*-Bu	Cl	Cl	Cl	*i*-Pr	Br	F	Br
t-Bu	Cl	F	Cl	*i*-Bu	Cl	Cl	Cl	*t*-Bu	Br	F	Br
Me	Br	Br	Cl	Me	Br	F	Cl	Me	Br	Cl	Cl
Et	Br	Br	Cl	Et	Br	F	Cl	Et	Br	Cl	Cl
i-Pr	Br	Br	Cl	*i*-Pr	Br	F	Cl	*i*-Pr	Br	Cl	Cl
t-Bu	Br	Br	Cl	*t*-Bu	Br	F	Cl	*t*-Bu	Br	Cl	Cl
Me	Br	Br	Br	Me	Br	F	Br	Me	Br	Cl	Br

R^5 is CHF_2				R^5 is CH_2F_3				R^5 is CF_2CHF_2			
R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6	R^3	R^{4a}	R^{4b}	R^6
Et	Br	Br	Br	Et	Br	F	Br	Et	Br	Cl	Br
i-Pr	Br	Br	Br	*i*-Pr	Br	F	Br	*i*-Pr	Br	Cl	Br
t-Bu	Br	Br	Br	*t*-Bu	Br	F	Br	*t*-Bu	Br	Cl	Br
Me	Br	I	Cl	Me	Br	Cl	Cl	Me	Br	Br	Cl
Et	Br	I	Cl	Et	Br	Cl	Cl	Et	Br	Br	Cl
i-Pr	Br	I	Cl	*i*-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl
t-Bu	Br	I	Cl	*t*-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl
Me	Br	I	Br	Me	Br	Cl	Br	Me	Br	Br	Br
Et	Br	I	Br	Et	Br	Cl	Br	Et	Br	Br	Br
i-Pr	Br	I	Br	*i*-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br
t-Bu	Br	I	Br	*t*-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br
Me	Br	F	Cl	Me	Br	I	Cl	Me	Br	CF_3	Cl
Et	Br	F	Cl	Et	Br	I	Cl	Et	Br	CF_3	Cl
i-Pr	Br	F	Cl	*i*-Pr	Br	I	Cl	*i*-Pr	Br	CF_3	Cl
t-Bu	Br	F	Cl	*t*-Bu	Br	I	Cl	*t*-Bu	Br	CF_3	Cl
Me	Br	F	Br	Me	Br	I	Br	Me	Br	CF_3	Br
Et	Br	F	Br	Et	Br	I	Br	Et	Br	CF_3	Br
i-Pr	Br	F	Br	*i*-Pr	Br	I	Br	*i*-Pr	Br	CF_3	Br
t-Bu	Br	F	Br	*t*-Bu	Br	I	Br	*t*-Bu	Br	CF_3	Br
Me	Br	Cl	Cl	Me	Br	Br	Cl	Me	Br	I	Cl
Et	Br	Cl	Cl	Et	Br	Br	Cl	Et	Br	I	Cl
i-Pr	Br	Cl	Cl	*i*-Pr	Br	Br	Cl	*i*-Pr	Br	I	Cl
t-Bu	Br	Cl	Cl	*t*-Bu	Br	Br	Cl	*t*-Bu	Br	I	Cl
Me	Br	Cl	Br	Me	Br	Br	Br	Me	Br	I	Br
Et	Br	Cl	Br	Et	Br	Br	Br	Et	Br	I	Br
i-Pr	Br	Cl	Br	*i*-Pr	Br	Br	Br	*i*-Pr	Br	I	Br
t-Bu	Br	Cl	Br	*t*-Bu	Br	Br	Br	*t*-Bu	Br	I	Br

Table 28



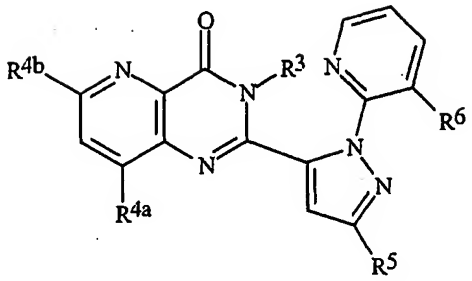
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	H	Cl	Br	Me	Cl	Br	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	H	Cl	Br	Et	Cl	Br	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	H	Br	Cl	Me	Cl	Br	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	H	Br	Cl	Et	Cl	Br	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	H	Br	Cl	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	H	Br	Cl	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	H	Br	Br	Me	Cl	Br	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	H	Br	Br	Et	Cl	Br	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	H	Br	Br	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	H	Br	Br	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	H	CF_3	Cl	Me	Cl	I	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	H	CF_3	Cl	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	H	CF_3	Br	Me	Cl	I	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	H	CF_3	Br	Et	Cl	I	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	H	CF_3	Br	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	H	CF_3	Br	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	H	Cl	Cl	Me	Cl	I	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	H	Cl	Cl	Et	Cl	I	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	H	Br	Br	*i*-Pr	Cl	H	Cl	Cl	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	CH_3	Cl	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	CH_3	Cl	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	F	CF_3	Br	Me	CH_3	Cl	CF_3	Br	Me	Cl	I	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	F	CF_3	Br	Et	CH_3	Cl	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	F	Cl	Cl	Me	CH_3	Cl	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	F	Cl	Cl	Et	CH_3	Cl	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	F	Cl	Br	Me	CH_3	Cl	Cl	Br	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	CH_3	Cl	Cl	Br	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	CH_3	Cl	Br	Cl	Me	Cl	CF_3	CF_3	Br
Et	CH_3	F	Br	Cl	Et	CH_3	Cl	Br	Cl	Et	Cl	CF_3	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	F	Br	Br	Me	CH_3	Cl	Br	Br	Me	Cl	CF_3	Cl	Cl
Et	CH_3	F	Br	Br	Et	CH_3	Cl	Br	Br	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	CH_3	Cl	Br	Br	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	CH_3	Cl	Br	Br	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Cl	F	Cl	Br	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Cl	F	Cl	Br	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Cl	F	Br	Cl	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Cl	F	Br	Cl	Et	Br	F	CF_3	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Cl	F	Br	Br	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Cl	F	Br	Br	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Cl	F	Br	Br	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Br	F	Cl	Br
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	CF_3	Cl	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	CF_3	Cl	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	CF_3	CF_3	Br	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	CF_3	CF_3	Br	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	CF_3	Cl	Cl	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	CF_3	Cl	Cl	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	CF_3	Cl	Br	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	CF_3	Cl	Br	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	Cl	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	CF_3	Br	Cl	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	CF_3	Br	Cl	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	Br	CF_3	Br	Br	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	Br	CF_3	Br	Br	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Cl	Me	Br	I	CF_3	Cl	Me	Br	Br	CF_3	Cl
Et	CH_3	CF_3	Br	Cl	Et	Br	I	CF_3	Cl	Et	Br	Br	CF_3	Cl
i-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Cl
t-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Cl
Me	CH_3	CF_3	Br	Br	Me	Br	I	CF_3	Br	Me	Br	Br	CF_3	Br
Et	CH_3	CF_3	Br	Br	Et	Br	I	CF_3	Br	Et	Br	Br	CF_3	Br
i-Pr	CH_3	CF_3	Br	Br	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Br	Br	CF_3	Br
t-Bu	CH_3	CF_3	Br	Br	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Br	Br	CF_3	Br
n-Pr	CH_3	Cl	Cl	Cl	Me	Br	I	Cl	Cl	Me	Br	Br	Cl	Cl
n-Bu	CH_3	Cl	Cl	Cl	Et	Br	I	Cl	Cl	Et	Br	Br	Cl	Cl
s-Bu	CH_3	Cl	Cl	Cl	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Br	Br	Cl	Cl
i-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Br	Br	Cl	Cl
Me	Cl	Cl	Br	Cl	Me	Br	I	Cl	Br	Me	Br	Br	Cl	Br
Et	Cl	Cl	Br	Cl	Et	Br	I	Cl	Br	Et	Br	Br	Cl	Br
i-Pr	Cl	Cl	Br	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Br	Br	Cl	Br
t-Bu	Cl	Cl	Br	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Br	Br	Cl	Br
Me	Cl	Cl	Br	Br	Me	Br	I	Br	Cl	Me	Br	Br	Br	Cl
Et	Cl	Cl	Br	Br	Et	Br	I	Br	Cl	Et	Br	Br	Br	Cl
i-Pr	Cl	Cl	Br	Br	*i*-Pr	Br	I	Br	Cl	*i*-Pr	Br	Br	Br	Cl
t-Bu	Cl	Cl	Br	Br	*t*-Bu	Br	I	Br	Cl	*t*-Bu	Br	Br	Br	Cl
Me	Cl	Br	CF_3	Cl	Me	Br	I	Br	Br	Me	Br	Br	Br	Br
Et	Cl	Br	CF_3	Cl	Et	Br	I	Br	Br	Et	Br	Br	Br	Br
i-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	Br	Br	Br
t-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	Br	Br	Br
Me	Cl	Br	CF_3	Br	Me	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	CF_3	Br
Et	Cl	Br	CF_3	Br	Et	Cl	Br	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl
i-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	Br	Cl	Cl					

Table 29



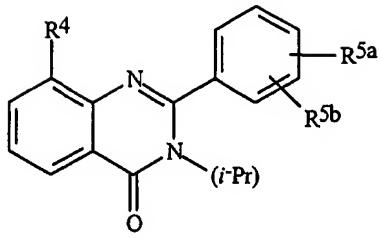
R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Me	CH_3	H	CF_3	Cl	Me	Cl	F	CF_3	Cl	Me	Cl	H	Cl	Br
Et	CH_3	H	CF_3	Cl	Et	Cl	F	CF_3	Cl	Et	Cl	H	Cl	Br
i-Pr	CH_3	H	CF_3	Cl	*i*-Pr	Cl	F	CF_3	Cl	*i*-Pr	Cl	H	Cl	Br
t-Bu	CH_3	H	CF_3	Cl	*t*-Bu	Cl	F	CF_3	Cl	*t*-Bu	Cl	H	Cl	Br
Me	CH_3	H	CF_3	Br	Me	Cl	F	CF_3	Br	Me	Cl	H	Br	Cl
Et	CH_3	H	CF_3	Br	Et	Cl	F	CF_3	Br	Et	Cl	H	Br	Cl
i-Pr	CH_3	H	CF_3	Br	*i*-Pr	Cl	F	CF_3	Br	*i*-Pr	Cl	H	Br	Cl
t-Bu	CH_3	H	CF_3	Br	*t*-Bu	Cl	F	CF_3	Br	*t*-Bu	Cl	H	Br	Cl
Me	CH_3	H	Cl	Cl	Me	Cl	F	Cl	Cl	Me	Cl	H	Br	Br
Et	CH_3	H	Cl	Cl	Et	Cl	F	Cl	Cl	Et	Cl	H	Br	Br
i-Pr	CH_3	H	Cl	Cl	*i*-Pr	Cl	F	Cl	Cl	*i*-Pr	Cl	H	Br	Br
t-Bu	CH_3	H	Cl	Cl	*t*-Bu	Cl	F	Cl	Cl	*t*-Bu	Cl	H	Br	Br
Me	CH_3	H	Cl	Br	Me	Cl	F	Cl	Br	Me	Cl	H	CF_3	Cl
Et	CH_3	H	Cl	Br	Et	Cl	F	Cl	Br	Et	Cl	H	CF_3	Cl
i-Pr	CH_3	H	Cl	Br	*i*-Pr	Cl	F	Cl	Br	*i*-Pr	Cl	H	CF_3	Cl
t-Bu	CH_3	H	Cl	Br	*t*-Bu	Cl	F	Cl	Br	*t*-Bu	Cl	H	CF_3	Cl
Me	CH_3	H	Br	Cl	Me	Cl	F	Br	Cl	Me	Cl	H	CF_3	Br
Et	CH_3	H	Br	Cl	Et	Cl	F	Br	Cl	Et	Cl	H	CF_3	Br
i-Pr	CH_3	H	Br	Cl	*i*-Pr	Cl	F	Br	Cl	*i*-Pr	Cl	H	CF_3	Br
t-Bu	CH_3	H	Br	Cl	*t*-Bu	Cl	F	Br	Cl	*t*-Bu	Cl	H	CF_3	Br
Me	CH_3	H	Br	Br	Me	Cl	F	Br	Br	Me	Cl	H	Cl	Cl
Et	CH_3	H	Br	Br	Et	Cl	F	Br	Br	Et	Cl	H	Cl	Cl
i-Pr	CH_3	H	Br	Br	*i*-Pr	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
t-Bu	CH_3	H	Br	Br	*t*-Bu	Cl	F	Br	Br	*i*-Pr	Cl	H	Cl	Cl
Me	CH_3	F	CF_3	Cl	Me	Cl	Cl	CF_3	Cl	Me	Cl	Br	Cl	Br
Et	CH_3	F	CF_3	Cl	Et	Cl	Cl	CF_3	Cl	Et	Cl	Br	Cl	Br
i-Pr	CH_3	F	CF_3	Cl	*i*-Pr	Cl	Cl	CF_3	Cl	*i*-Pr	Cl	Br	Cl	Br
t-Bu	CH_3	F	CF_3	Cl	*t*-Bu	Cl	Cl	CF_3	Cl	*t*-Bu	Cl	Br	Cl	Br
Me	CH_3	F	CF_3	Br	Me	Cl	Cl	CF_3	Br	Me	Cl	Br	Br	Cl

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
Et	CH_3	F	CF_3	Br	Et	Cl	Cl	CF_3	Br	Et	Cl	Br	Br	Cl
i-Pr	CH_3	F	CF_3	Br	*i*-Pr	Cl	Cl	CF_3	Br	*i*-Pr	Cl	Br	Br	Cl
t-Bu	CH_3	F	CF_3	Br	*t*-Bu	Cl	Cl	CF_3	Br	*t*-Bu	Cl	Br	Br	Cl
Me	CH_3	F	Cl	Cl	Me	Cl	Cl	Cl	Cl	Me	Cl	Br	Br	Br
Et	CH_3	F	Cl	Cl	Et	Cl	Cl	Cl	Cl	Et	Cl	Br	Br	Br
i-Pr	CH_3	F	Cl	Cl	*i*-Pr	Cl	Cl	Cl	Cl	*i*-Pr	Cl	Br	Br	Br
t-Bu	CH_3	F	Cl	Cl	*t*-Bu	Cl	Cl	Cl	Cl	*t*-Bu	Cl	Br	Br	Br
Me	CH_3	F	Cl	Br	Me	Cl	Cl	Cl	Br	Me	Cl	I	CF_3	Cl
Et	CH_3	F	Cl	Br	Et	Cl	Cl	Cl	Br	Et	Cl	I	CF_3	Cl
i-Pr	CH_3	F	Cl	Br	*i*-Pr	Cl	Cl	Cl	Br	*i*-Pr	Cl	I	CF_3	Cl
t-Bu	CH_3	F	Cl	Br	*t*-Bu	Cl	Cl	Cl	Br	*t*-Bu	Cl	I	CF_3	Cl
Me	CH_3	F	Br	Cl	Me	Cl	Cl	Br	Cl	Me	Cl	I	CF_3	Br
Et	CH_3	F	Br	Cl	Et	Cl	Cl	Br	Cl	Et	Cl	I	CF_3	Br
i-Pr	CH_3	F	Br	Cl	*i*-Pr	Cl	Cl	Br	Cl	*i*-Pr	Cl	I	CF_3	Br
t-Bu	CH_3	F	Br	Cl	*t*-Bu	Cl	Cl	Br	Cl	*t*-Bu	Cl	I	CF_3	Br
Me	CH_3	F	Br	Br	Me	Cl	Cl	Br	Br	Me	Cl	I	Cl	Cl
Et	CH_3	F	Br	Br	Et	Cl	Cl	Br	Br	Et	Cl	I	Cl	Cl
i-Pr	CH_3	F	Br	Br	*i*-Pr	Cl	Cl	Br	Br	*i*-Pr	Cl	I	Cl	Cl
t-Bu	CH_3	F	Br	Br	*t*-Bu	Cl	Cl	Br	Br	*t*-Bu	Cl	I	Cl	Cl
Me	CH_3	Cl	CF_3	Cl	Me	Cl	Br	CF_3	Cl	Me	Cl	I	Cl	Br
Et	CH_3	Cl	CF_3	Cl	Et	Cl	Br	CF_3	Cl	Et	Cl	I	Cl	Br
i-Pr	CH_3	Cl	CF_3	Cl	*i*-Pr	Cl	Br	CF_3	Cl	*i*-Pr	Cl	I	Cl	Br
t-Bu	CH_3	Cl	CF_3	Cl	*t*-Bu	Cl	Br	CF_3	Cl	*t*-Bu	Cl	I	Cl	Br
Me	CH_3	Cl	CF_3	Br	Me	Cl	Br	CF_3	Br	Me	Cl	I	Br	Cl
Et	CH_3	Cl	CF_3	Br	Et	Cl	Br	CF_3	Br	Et	Cl	I	Br	Cl
i-Pr	CH_3	Cl	CF_3	Br	*i*-Pr	Cl	Br	CF_3	Br	*i*-Pr	Cl	I	Br	Cl
t-Bu	CH_3	Cl	CF_3	Br	*t*-Bu	Cl	Br	CF_3	Br	*t*-Bu	Cl	I	Br	Cl
Me	CH_3	Cl	Cl	Cl	Me	Cl	Br	Cl	Cl	Me	Cl	I	Br	Br
Et	CH_3	Cl	Cl	Cl	Et	Cl	Br	Cl	Cl	Et	Cl	I	Br	Br
i-Pr	CH_3	Cl	Cl	Cl	*i*-Pr	Cl	Br	Cl	Cl	*i*-Pr	Cl	I	Br	Br
t-Bu	CH_3	Cl	Cl	Cl	*t*-Bu	Cl	Br	Cl	Cl	*t*-Bu	Cl	I	Br	Br
Me	CH_3	Cl	Cl	Br	Me	Br	Br	Br	Cl	Me	Cl	CF_3	CF_3	Cl
Et	CH_3	Cl	Cl	Br	Et	Br	Br	Br	Cl	Et	Cl	CF_3	CF_3	Cl
i-Pr	CH_3	Cl	Cl	Br	*i*-Pr	Br	Br	Br	Cl	*i*-Pr	Cl	CF_3	CF_3	Cl
t-Bu	CH_3	Cl	Cl	Br	*t*-Bu	Br	Br	Br	Cl	*t*-Bu	Cl	CF_3	CF_3	Cl
Me	CH_3	Cl	Br	Cl	Me	Br	Br	Br	Br	Me	Cl	CF_3	CF_3	Br
Et	CH_3	Cl	Br	Cl	Et	Br	Br	Br	Br	Et	Cl	CF_3	CF_3	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
i-Pr	CH_3	Cl	Br	Cl	*i*-Pr	Br	Br	Br	Br	*i*-Pr	Cl	CF_3	CF_3	Br
t-Bu	CH_3	Cl	Br	Cl	*t*-Bu	Br	Br	Br	Br	*t*-Bu	Cl	CF_3	CF_3	Br
Me	CH_3	Cl	Br	Br	Me	Br	I	CF_3	Cl	Me	Cl	CF_3	Cl	Cl
Et	CH_3	Cl	Br	Br	Et	Br	I	CF_3	Cl	Et	Cl	CF_3	Cl	Cl
i-Pr	CH_3	Cl	Br	Br	*i*-Pr	Br	I	CF_3	Cl	*i*-Pr	Cl	CF_3	Cl	Cl
t-Bu	CH_3	Cl	Br	Br	*t*-Bu	Br	I	CF_3	Cl	*t*-Bu	Cl	CF_3	Cl	Cl
Me	CH_3	Br	CF_3	Cl	Me	Br	I	CF_3	Br	Me	Cl	CF_3	Cl	Br
Et	CH_3	Br	CF_3	Cl	Et	Br	I	CF_3	Br	Et	Cl	CF_3	Cl	Br
i-Pr	CH_3	Br	CF_3	Cl	*i*-Pr	Br	I	CF_3	Br	*i*-Pr	Cl	CF_3	Cl	Br
t-Bu	CH_3	Br	CF_3	Cl	*t*-Bu	Br	I	CF_3	Br	*t*-Bu	Cl	CF_3	Cl	Br
Me	CH_3	Br	CF_3	Br	Me	Br	I	Cl	Cl	Me	Cl	CF_3	Br	Cl
Et	CH_3	Br	CF_3	Br	Et	Br	I	Cl	Cl	Et	Cl	CF_3	Br	Cl
i-Pr	CH_3	Br	CF_3	Br	*i*-Pr	Br	I	Cl	Cl	*i*-Pr	Cl	CF_3	Br	Cl
t-Bu	CH_3	Br	CF_3	Br	*t*-Bu	Br	I	Cl	Cl	*t*-Bu	Cl	CF_3	Br	Cl
Me	CH_3	Br	Cl	Cl	Me	Br	I	Cl	Br	Me	Cl	CF_3	Br	Br
Et	CH_3	Br	Cl	Cl	Et	Br	I	Cl	Br	Et	Cl	CF_3	Br	Br
i-Pr	CH_3	Br	Cl	Cl	*i*-Pr	Br	I	Cl	Br	*i*-Pr	Cl	CF_3	Br	Br
t-Bu	CH_3	Br	Cl	Cl	*t*-Bu	Br	I	Cl	Br	*t*-Bu	Cl	CF_3	Br	Br
Me	CH_3	Br	Cl	Br	Me	Br	I	Br	Cl	*n*-Pr	Cl	Cl	Cl	Cl
Et	CH_3	Br	Cl	Br	Et	Br	I	Br	Cl	*n*-Bu	Cl	Cl	Cl	Cl
i-Pr	CH_3	Br	Cl	Br	*i*-Pr	Br	I	Br	Cl	*s*-Bu	Cl	Cl	Cl	Cl
t-Bu	CH_3	Br	Cl	Br	*t*-Bu	Br	I	Br	Cl	*i*-Bu	Cl	Cl	Cl	Cl
Me	CH_3	Br	Br	Cl	Me	Br	I	Br	Br	Me	Br	F	CF_3	Cl
Et	CH_3	Br	Br	Cl	Et	Br	I	Br	Br	Et	Br	F	CF_3	Cl
i-Pr	CH_3	Br	Br	Cl	*i*-Pr	Br	I	Br	Br	*i*-Pr	Br	F	CF_3	Cl
t-Bu	CH_3	Br	Br	Cl	*t*-Bu	Br	I	Br	Br	*t*-Bu	Br	F	CF_3	Cl
Me	CH_3	Br	Br	Br	Me	Br	CF_3	CF_3	Cl	Me	Br	F	CF_3	Br
Et	CH_3	Br	Br	Br	Et	Br	CF_3	CF_3	Cl	Et	Br	F	CF_3	Br
i-Pr	CH_3	Br	Br	Br	*i*-Pr	Br	CF_3	CF_3	Cl	*i*-Pr	Br	F	CF_3	Br
t-Bu	CH_3	Br	Br	Br	*t*-Bu	Br	CF_3	CF_3	Cl	*t*-Bu	Br	F	CF_3	Br
Me	CH_3	I	CF_3	Cl	Me	Br	CF_3	CF_3	Br	Me	Br	F	Cl	Cl
Et	CH_3	I	CF_3	Cl	Et	Br	CF_3	CF_3	Br	Et	Br	F	Cl	Cl
i-Pr	CH_3	I	CF_3	Cl	*i*-Pr	Br	CF_3	CF_3	Br	*i*-Pr	Br	F	Cl	Cl
t-Bu	CH_3	I	CF_3	Cl	*t*-Bu	Br	CF_3	CF_3	Br	*t*-Bu	Br	F	Cl	Cl
Me	CH_3	I	CF_3	Br	Me	Br	CF_3	Cl	Cl	Me	Br	F	Cl	Br
Et	CH_3	I	CF_3	Br	Et	Br	CF_3	Cl	Cl	Et	Br	F	Cl	Br
i-Pr	CH_3	I	CF_3	Br	*i*-Pr	Br	CF_3	Cl	Cl	*i*-Pr	Br	F	Cl	Br

R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6	R^3	R^{4a}	R^{4b}	R^5	R^6
t-Bu	CH_3	I	CF_3	Br	*t*-Bu	Br	CF_3	Cl	Cl	*t*-Bu	Br	F	Cl	Br
Me	CH_3	I	Cl	Cl	Me	Br	CF_3	Cl	Br	Me	Br	F	Br	Cl
Et	CH_3	I	Cl	Cl	Et	Br	CF_3	Cl	Br	Et	Br	F	Br	Cl
i-Pr	CH_3	I	Cl	Cl	*i*-Pr	Br	CF_3	Cl	Br	*i*-Pr	Br	F	Br	Cl
t-Bu	CH_3	I	Cl	Cl	*t*-Bu	Br	CF_3	Cl	Br	*t*-Bu	Br	F	Br	Cl
Me	CH_3	I	Cl	Br	Me	Br	CF_3	Br	Cl	Me	Br	F	Br	Br
Et	CH_3	I	Cl	Br	Et	Br	CF_3	Br	Cl	Et	Br	F	Br	Br
i-Pr	CH_3	I	Cl	Br	*i*-Pr	Br	CF_3	Br	Cl	*i*-Pr	Br	F	Br	Br
t-Bu	CH_3	I	Cl	Br	*t*-Bu	Br	CF_3	Br	Cl	*t*-Bu	Br	F	Br	Br
Me	CH_3	I	Br	Cl	Me	Br	CF_3	Br	Br	Me	Br	Cl	CF_3	Cl
Et	CH_3	I	Br	Cl	Et	Br	CF_3	Br	Br	Et	Br	Cl	CF_3	Cl
i-Pr	CH_3	I	Br	Cl	*i*-Pr	Br	CF_3	Br	Br	*i*-Pr	Br	Cl	CF_3	Cl
t-Bu	CH_3	I	Br	Cl	*t*-Bu	Br	CF_3	Br	Br	*t*-Bu	Br	Cl	CF_3	Cl
Me	CH_3	I	Br	Br	Me	Br	Br	CF_3	Cl	Me	Br	Cl	CF_3	Br
Et	CH_3	I	Br	Br	Et	Br	Br	CF_3	Cl	Et	Br	Cl	CF_3	Br
i-Pr	CH_3	I	Br	Br	*i*-Pr	Br	Br	CF_3	Cl	*i*-Pr	Br	Cl	CF_3	Br
t-Bu	CH_3	I	Br	Br	*t*-Bu	Br	Br	CF_3	Cl	*t*-Bu	Br	Cl	CF_3	Br
Me	CH_3	CF_3	CF_3	Cl	Me	Br	Br	CF_3	Br	Me	Br	Cl	Cl	Cl
Et	CH_3	CF_3	CF_3	Cl	Et	Br	Br	CF_3	Br	Et	Br	Cl	Cl	Cl
i-Pr	CH_3	CF_3	CF_3	Cl	*i*-Pr	Br	Br	CF_3	Br	*i*-Pr	Br	Cl	Cl	Cl
t-Bu	CH_3	CF_3	CF_3	Cl	*t*-Bu	Br	Br	CF_3	Br	*t*-Bu	Br	Cl	Cl	Cl
Me	CH_3	CF_3	CF_3	Br	Me	Br	Br	Cl	Cl	Me	Br	Cl	Cl	Br
Et	CH_3	CF_3	CF_3	Br	Et	Br	Br	Cl	Cl	Et	Br	Cl	Cl	Br
i-Pr	CH_3	CF_3	CF_3	Br	*i*-Pr	Br	Br	Cl	Cl	*i*-Pr	Br	Cl	Cl	Br
t-Bu	CH_3	CF_3	CF_3	Br	*t*-Bu	Br	Br	Cl	Cl	*t*-Bu	Br	Cl	Cl	Br
Me	CH_3	CF_3	Cl	Cl	Me	Br	Br	Cl	Br	Me	Br	Cl	Br	Cl
Et	CH_3	CF_3	Cl	Cl	Et	Br	Br	Cl	Br	Et	Br	Cl	Br	Cl
i-Pr	CH_3	CF_3	Cl	Cl	*i*-Pr	Br	Br	Cl	Br	*i*-Pr	Br	Cl	Br	Cl
t-Bu	CH_3	CF_3	Cl	Cl	*t*-Bu	Br	Br	Cl	Br	*t*-Bu	Br	Cl	Br	Cl
Me	CH_3	CF_3	Cl	Br	Me	CH_3	CF_3	Br	Cl	Me	Br	Cl	Br	Br
Et	CH_3	CF_3	Cl	Br	Et	CH_3	CF_3	Br	Cl	Et	Br	Cl	Br	Br
i-Pr	CH_3	CF_3	Cl	Br	*i*-Pr	CH_3	CF_3	Br	Cl	*i*-Pr	Br	Cl	Br	Br
t-Bu	CH_3	CF_3	Cl	Br	*t*-Bu	CH_3	CF_3	Br	Cl	*t*-Bu	Br	Cl	Br	Br
Me	CH_3	CF_3	Br	Br	*n*-Pr	CH_3	Cl	Cl	Cl	*t*-Bu	CH_3	CF_3	Br	Br
Et	CH_3	CF_3	Br	Br	*n*-Bu	CH_3	Cl	Cl	Cl	*i*-Bu	CH_3	Cl	Cl	Cl
i-Pr	CH_3	CF_3	Br	Br	*s*-Bu	CH_3	Cl	Cl	Cl					

Table 30



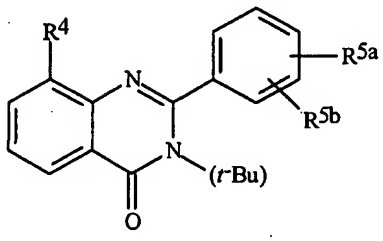
R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}
Me	2-CF_3	Me	3-CF_3	Me	4-CF_3
Me	2-OCF_3	Me	3-OCF_3	Me	4-OCF_3
Me	2-OCF_2H	Me	3-OCF_2H	Me	4-OCF_2H
Me	2-OCF_2CF_2H	Me	3-OCF_2CF_2H	Me	4-OCF_2CF_2H
Me	2-OCH_2CF_3	Me	3-OCH_2CF_3	Me	4-OCH_2CF_3
Me	2-SCF_3	Me	3-SCF_3	Me	4-SCF_3
Me	2-$SOCF_3$	Me	3-$SOCF_3$	Me	4-$SOCF_3$
Me	2-SO_2CF_3	Me	3-SO_2CF_3	Me	4-SO_2CF_3
Me	2-SCF_2H	Me	3-SCF_2H	Me	4-SCF_2H
Me	2-$SOCF_2H$	Me	3-$SOCF_2H$	Me	4-$SOCF_2H$
Me	2-SO_2CF_2H	Me	3-SO_2CF_2H	Me	4-SO_2CF_2H
Cl	2-CF_3	Cl	3-CF_3	Cl	4-CF_3
Cl	2-OCF_3	Cl	3-OCF_3	Cl	4-OCF_3
Cl	2-OCF_2H	Cl	3-OCF_2H	Cl	4-OCF_2H
Cl	2-OCF_2CF_2H	Cl	3-OCF_2CF_2H	Cl	4-OCF_2CF_2H
Cl	2-OCH_2CF_3	Cl	3-OCH_2CF_3	Cl	4-OCH_2CF_3
Cl	2-SCF_3	Cl	3-SCF_3	Cl	4-SCF_3
Cl	2-$SOCF_3$	Cl	3-$SOCF_3$	Cl	4-$SOCF_3$
Cl	2-SO_2CF_3	Cl	3-SO_2CF_3	Cl	4-SO_2CF_3
Cl	2-SCF_2H	Cl	3-SCF_2H	Cl	4-SCF_2H
Cl	2-$SOCF_2H$	Cl	3-$SOCF_2H$	Cl	4-$SOCF_2H$
Cl	2-SO_2CF_2H	Cl	3-SO_2CF_2H	Cl	4-SO_2CF_2H
F	2-CF_3	F	3-CF_3	F	4-CF_3
F	2-OCF_3	F	3-OCF_3	F	4-OCF_3
F	2-OCF_2H	F	3-OCF_2H	F	4-OCF_2H
F	2-OCF_2CF_2H	F	3-OCF_2CF_2H	F	4-OCF_2CF_2H
F	2-OCH_2CF_3	F	3-OCH_2CF_3	F	4-OCH_2CF_3
F	2-SCF_3	F	3-SCF_3	F	4-SCF_3
F	2-$SOCF_3$	F	3-$SOCF_3$	F	4-$SOCF_3$

F	2-SO_2CF_3	F	3-SO_2CF_3	F	4-SO_2CF_3
F	2-SCF_2H	F	3-SCF_2H	F	4-SCF_2H
F	2-$SOCF_2H$	F	3-$SOCF_2H$	F	4-$SOCF_2H$
F	2-SO_2CF_2H	F	3-SO_2CF_2H	F	4-SO_2CF_2H
Br	2-CF_3	Br	3-CF_3	Br	4-CF_3
Br	2-OCF_3	Br	3-OCF_3	Br	4-OCF_3
Br	2-OCF_2H	Br	3-OCF_2H	Br	4-OCF_2H
Br	2-OCF_2CF_2H	Br	3-OCF_2CF_2H	Br	4-OCF_2CF_2H
Br	2-OCH_2CF_3	Br	3-OCH_2CF_3	Br	4-OCH_2CF_3
Br	2-SCF_3	Br	3-SCF_3	Br	4-SCF_3
Br	2-$SOCF_3$	Br	3-$SOCF_3$	Br	4-$SOCF_3$
Br	2-SO_2CF_3	Br	3-SO_2CF_3	Br	4-SO_2CF_3
Br	2-SCF_2H	Br	3-SCF_2H	Br	4-SCF_2H
Br	2-$SOCF_2H$	Br	3-$SOCF_2H$	Br	4-$SOCF_2H$
Br	2-SO_2CF_2H	Br	3-SO_2CF_2H	Br	4-SO_2CF_2H
I	2-CF_3	I	3-CF_3	I	4-CF_3
I	2-OCF_3	I	3-OCF_3	I	4-OCF_3
I	2-OCF_2H	I	3-OCF_2H	I	4-OCF_2H
I	2-OCF_2CF_2H	I	3-OCF_2CF_2H	I	4-OCF_2CF_2H
I	2-OCH_2CF_3	I	3-OCH_2CF_3	I	4-OCH_2CF_3
I	2-SCF_3	I	3-SCF_3	I	4-SCF_3
I	2-$SOCF_3$	I	3-$SOCF_3$	I	4-$SOCF_3$
I	2-SO_2CF_3	I	3-SO_2CF_3	I	4-SO_2CF_3
I	2-SCF_2H	I	3-SCF_2H	I	4-SCF_2H
I	2-$SOCF_2H$	I	3-$SOCF_2H$	I	4-$SOCF_2H$
I	2-SO_2CF_2H	I	3-SO_2CF_2H	I	4-SO_2CF_2H
OMe	2-CF_3	OMe	3-CF_3	OMe	4-CF_3
OMe	2-OCF_3	OMe	3-OCF_3	OMe	4-OCF_3
OMe	2-OCF_2H	OMe	3-OCF_2H	OMe	4-OCF_2H
OMe	2-OCF_2CF_2H	OMe	3-OCF_2CF_2H	OMe	4-OCF_2CF_2H
OMe	2-OCH_2CF_3	OMe	3-OCH_2CF_3	OMe	4-OCH_2CF_3
OMe	2-SCF_3	OMe	3-SCF_3	OMe	4-SCF_3
OMe	2-$SOCF_3$	OMe	3-$SOCF_3$	OMe	4-$SOCF_3$
OMe	2-SO_2CF_3	OMe	3-SO_2CF_3	OMe	4-SO_2CF_3
OMe	2-SCF_2H	OMe	3-SCF_2H	OMe	4-SCF_2H
OMe	2-$SOCF_2H$	OMe	3-$SOCF_2H$	OMe	4-$SOCF_2H$
OMe	2-SO_2CF_2H	OMe	3-SO_2CF_2H	OMe	4-SO_2CF_2H
CF_3	2-CF_3	CF_3	3-CF_3	CF_3	4-CF_3

CF_3	2-OCF_3	CF_3	3-OCF_3	CF_3	4-OCF_3
CF_3	2-OCF_2H	CF_3	3-OCF_2H	CF_3	4-OCF_2H
CF_3	2-OCF_2CF_2H	CF_3	3-OCF_2CF_2H	CF_3	4-OCF_2CF_2H
CF_3	2-OCH_2CF_3	CF_3	3-OCH_2CF_3	CF_3	4-OCH_2CF_3
CF_3	2-SCF_3	CF_3	3-SCF_3	CF_3	4-SCF_3
CF_3	2-$SOCF_3$	CF_3	3-$SOCF_3$	CF_3	4-$SOCF_3$
CF_3	2-SO_2CF_3	CF_3	3-SO_2CF_3	CF_3	4-SO_2CF_3
CF_3	2-SCF_2H	CF_3	3-SCF_2H	CF_3	4-SCF_2H
CF_3	2-$SOCF_2H$	CF_3	3-$SOCF_2H$	CF_3	4-$SOCF_2H$
CF_3	2-SO_2CF_2H	CF_3	3-SO_2CF_2H	CF_3	4-SO_2CF_2H
OCF_2H	2-CF_3	OCF_2H	3-CF_3	OCF_2H	4-CF_3
OCF_2H	2-OCF_3	OCF_2H	3-OCF_3	OCF_2H	4-OCF_3
OCF_2H	2-OCF_2H	OCF_2H	3-OCF_2H	OCF_2H	4-OCF_2H
OCF_2H	2-OCF_2CF_2H	OCF_2H	3-OCF_2CF_2H	OCF_2H	4-OCF_2CF_2H
OCF_2H	2-OCH_2CF_3	OCF_2H	3-OCH_2CF_3	OCF_2H	4-OCH_2CF_3
OCF_2H	2-SCF_3	OCF_2H	3-SCF_3	OCF_2H	4-SCF_3
OCF_2H	2-$SOCF_3$	OCF_2H	3-$SOCF_3$	OCF_2H	4-$SOCF_3$
OCF_2H	2-SO_2CF_3	OCF_2H	3-SO_2CF_3	OCF_2H	4-SO_2CF_3
OCF_2H	2-SCF_2H	OCF_2H	3-SCF_2H	OCF_2H	4-SCF_2H
OCF_2H	2-$SOCF_2H$	OCF_2H	3-$SOCF_2H$	OCF_2H	4-$SOCF_2H$
OCF_2H	2-SO_2CF_2H	OCF_2H	3-SO_2CF_2H	OCF_2H	4-SO_2CF_2H
Me	2-Me-4-CF_3	F	2-Me-4-CF_3	Cl	2-Me-4-CF_3
Me	2-Me-4-OCF_3	F	2-Me-4-OCF_3	Cl	2-Me-4-OCF_3
Me	2-Me-4-OCF_2H	F	2-Me-4-OCF_2H	Cl	2-Me-4-OCF_2H
Me	2-Me-4-OCH_2CF_3	F	2-Me-4-OCH_2CF_3	Cl	2-Me-4-OCH_2CF_3
Me	2-Me-4-SCF_3	F	2-Me-4-SCF_3	Cl	2-Me-4-SCF_3
Me	2-Me-4-$SOCF_3$	F	2-Me-4-$SOCF_3$	Cl	2-Me-4-$SOCF_3$
Me	2-Me-4-SO_2CF_3	F	2-Me-4-SO_2CF_3	Cl	2-Me-4-SO_2CF_3
Me	2-Me-4-SCF_2H	F	2-Me-4-SCF_2H	Cl	2-Me-4-SCF_2H
Me	2-Me-4-$SOCF_2H$	F	2-Me-4-$SOCF_2H$	Cl	2-Me-4-$SOCF_2H$
Me	2-Me-4-SO_2CF_2H	F	2-Me-4-SO_2CF_2H	Cl	2-Me-4-SO_2CF_2H
Br	2-Me-4-CF_3	I	2-Me-4-CF_3	OMe	2-Me-4-CF_3
Br	2-Me-4-OCF_3	I	2-Me-4-OCF_3	OMe	2-Me-4-OCF_3
Br	2-Me-4-OCF_2H	I	2-Me-4-OCF_2H	OMe	2-Me-4-OCF_2H
Br	2-Me-4-OCH_2CF_3	I	2-Me-4-OCH_2CF_3	OMe	2-Me-4-OCH_2CF_3
Br	2-Me-4-SCF_3	I	2-Me-4-SCF_3	OMe	2-Me-4-SCF_3
Br	2-Me-4-$SOCF_3$	I	2-Me-4-$SOCF_3$	OMe	2-Me-4-$SOCF_3$
Br	2-Me-4-SO_2CF_3	I	2-Me-4-SO_2CF_3	OMe	2-Me-4-SO_2CF_3

Br	2-Me-4-SCF_2H	I	2-Me-4-SCF_2H	OMe	2-Me-4-SCF_2H
Br	2-Me-4-$SOCF_2H$	I	2-Me-4-$SOCF_2H$	OMe	2-Me-4-$SOCF_2H$
Br	2-Me-4-SO_2CF_2H	I	2-Me-4-SO_2CF_2H	OMe	2-Me-4-SO_2CF_2H
CF_3	2-Me-4-CF_3	NO_2	2-Me-4-CF_3	SMe	2-Me-4-CF_3
CF_3	2-Me-4-OCF_3	NO_2	2-Me-4-OCF_3	SMe	2-Me-4-OCF_3
CF_3	2-Me-4-OCF_2H	NO_2	2-Me-4-OCF_2H	SMe	2-Me-4-OCF_2H
CF_3	2-Me-4-OCH_2CF_3	NO_2	2-Me-4-OCH_2CF_3	SMe	2-Me-4-OCH_2CF_3
CF_3	2-Me-4-SCF_3	NO_2	2-Me-4-SCF_3	SMe	2-Me-4-SCF_3
CF_3	2-Me-4-$SOCF_3$	NO_2	2-Me-4-$SOCF_3$	SMe	2-Me-4-$SOCF_3$
CF_3	2-Me-4-SO_2CF_3	NO_2	2-Me-4-SO_2CF_3	SMe	2-Me-4-SO_2CF_3
CF_3	2-Me-4-SCF_2H	NO_2	2-Me-4-SCF_2H	SMe	2-Me-4-SCF_2H
CF_3	2-Me-4-$SOCF_2H$	NO_2	2-Me-4-$SOCF_2H$	SMe	2-Me-4-$SOCF_2H$
CF_3	2-Me-4-SO_2CF_2H	NO_2	2-Me-4-SO_2CF_2H	SMe	2-Me-4-SO_2CF_2H

Table 31



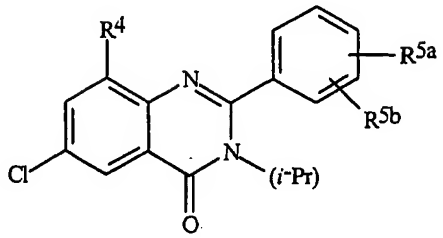
R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}
Me	2-CF_3	Me	3-CF_3	Me	4-CF_3
Me	2-OCF_3	Me	3-OCF_3	Me	4-OCF_3
Me	2-OCF_2H	Me	3-OCF_2H	Me	4-OCF_2H
Me	2-OCF_2CF_2H	Me	3-OCF_2CF_2H	Me	4-OCF_2CF_2H
Me	2-OCH_2CF_3	Me	3-OCH_2CF_3	Me	4-OCH_2CF_3
Me	2-SCF_3	Me	3-SCF_3	Me	4-SCF_3
Me	2-$SOCF_3$	Me	3-$SOCF_3$	Me	4-$SOCF_3$
Me	2-SO_2CF_3	Me	3-SO_2CF_3	Me	4-SO_2CF_3
Me	2-SCF_2H	Me	3-SCF_2H	Me	4-SCF_2H
Me	2-$SOCF_2H$	Me	3-$SOCF_2H$	Me	4-$SOCF_2H$
Me	2-SO_2CF_2H	Me	3-SO_2CF_2H	Me	4-SO_2CF_2H
Cl	2-CF_3	Cl	3-CF_3	Cl	4-CF_3
Cl	2-OCF_3	Cl	3-OCF_3	Cl	4-OCF_3
Cl	2-OCF_2H	Cl	3-OCF_2H	Cl	4-OCF_2H
Cl	2-OCF_2CF_2H	Cl	3-OCF_2CF_2H	Cl	4-OCF_2CF_2H
Cl	2-OCH_2CF_3	Cl	3-OCH_2CF_3	Cl	4-OCH_2CF_3

Cl	2-SCF_3	Cl	3-SCF_3	Cl	4-SCF_3
Cl	2-$SOCF_3$	Cl	3-$SOCF_3$	Cl	4-$SOCF_3$
Cl	2-SO_2CF_3	Cl	3-SO_2CF_3	Cl	4-SO_2CF_3
Cl	2-SCF_2H	Cl	3-SCF_2H	Cl	4-SCF_2H
Cl	2-$SOCF_2H$	Cl	3-$SOCF_2H$	Cl	4-$SOCF_2H$
Cl	2-SO_2CF_2H	Cl	3-SO_2CF_2H	Cl	4-SO_2CF_2H
F	2-CF_3	F	3-CF_3	F	4-CF_3
F	2-OCF_3	F	3-OCF_3	F	4-OCF_3
F	2-OCF_2H	F	3-OCF_2H	F	4-OCF_2H
F	2-OCF_2CF_2H	F	3-OCF_2CF_2H	F	4-OCF_2CF_2H
F	2-OCH_2CF_3	F	3-OCH_2CF_3	F	4-OCH_2CF_3
F	2-SCF_3	F	3-SCF_3	F	4-SCF_3
F	2-$SOCF_3$	F	3-$SOCF_3$	F	4-$SOCF_3$
F	2-SO_2CF_3	F	3-SO_2CF_3	F	4-SO_2CF_3
F	2-SCF_2H	F	3-SCF_2H	F	4-SCF_2H
F	2-$SOCF_2H$	F	3-$SOCF_2H$	F	4-$SOCF_2H$
F	2-SO_2CF_2H	F	3-SO_2CF_2H	F	4-SO_2CF_2H
Br	2-CF_3	Br	3-CF_3	Br	4-CF_3
Br	2-OCF_3	Br	3-OCF_3	Br	4-OCF_3
Br	2-OCF_2H	Br	3-OCF_2H	Br	4-OCF_2H
Br	2-OCF_2CF_2H	Br	3-OCF_2CF_2H	Br	4-OCF_2CF_2H
Br	2-OCH_2CF_3	Br	3-OCH_2CF_3	Br	4-OCH_2CF_3
Br	2-SCF_3	Br	3-SCF_3	Br	4-SCF_3
Br	2-$SOCF_3$	Br	3-$SOCF_3$	Br	4-$SOCF_3$
Br	2-SO_2CF_3	Br	3-SO_2CF_3	Br	4-SO_2CF_3
Br	2-SCF_2H	Br	3-SCF_2H	Br	4-SCF_2H
Br	2-$SOCF_2H$	Br	3-$SOCF_2H$	Br	4-$SOCF_2H$
Br	2-SO_2CF_2H	Br	3-SO_2CF_2H	Br	4-SO_2CF_2H
I	2-CF_3	I	3-CF_3	I	4-CF_3
I	2-OCF_3	I	3-OCF_3	I	4-OCF_3
I	2-OCF_2H	I	3-OCF_2H	I	4-OCF_2H
I	2-OCF_2CF_2H	I	3-OCF_2CF_2H	I	4-OCF_2CF_2H
I	2-OCH_2CF_3	I	3-OCH_2CF_3	I	4-OCH_2CF_3
I	2-SCF_3	I	3-SCF_3	I	4-SCF_3
I	2-$SOCF_3$	I	3-$SOCF_3$	I	4-$SOCF_3$
I	2-SO_2CF_3	I	3-SO_2CF_3	I	4-SO_2CF_3
I	2-SCF_2H	I	3-SCF_2H	I	4-SCF_2H
I	2-$SOCF_2H$	I	3-$SOCF_2H$	I	4-$SOCF_2H$

I	2-SO_2CF_2H	I	3-SO_2CF_2H	I	4-SO_2CF_2H
OMe	2-CF_3	OMe	3-CF_3	OMe	4-CF_3
OMe	2-OCF_3	OMe	3-OCF_3	OMe	4-OCF_3
OMe	2-OCF_2H	OMe	3-OCF_2H	OMe	4-OCF_2H
OMe	2-OCF_2CF_2H	OMe	3-OCF_2CF_2H	OMe	4-OCF_2CF_2H
OMe	2-OCH_2CF_3	OMe	3-OCH_2CF_3	OMe	4-OCH_2CF_3
OMe	2-SCF_3	OMe	3-SCF_3	OMe	4-SCF_3
OMe	2-$SOCF_3$	OMe	3-$SOCF_3$	OMe	4-$SOCF_3$
OMe	2-SO_2CF_3	OMe	3-SO_2CF_3	OMe	4-SO_2CF_3
OMe	2-SCF_2H	OMe	3-SCF_2H	OMe	4-SCF_2H
OMe	2-$SOCF_2H$	OMe	3-$SOCF_2H$	OMe	4-$SOCF_2H$
OMe	2-SO_2CF_2H	OMe	3-SO_2CF_2H	OMe	4-SO_2CF_2H
CF_3	2-CF_3	CF_3	3-CF_3	CF_3	4-CF_3
CF_3	2-OCF_3	CF_3	3-OCF_3	CF_3	4-OCF_3
CF_3	2-OCF_2H	CF_3	3-OCF_2H	CF_3	4-OCF_2H
CF_3	2-OCF_2CF_2H	CF_3	3-OCF_2CF_2H	CF_3	4-OCF_2CF_2H
CF_3	2-OCH_2CF_3	CF_3	3-OCH_2CF_3	CF_3	4-OCH_2CF_3
CF_3	2-SCF_3	CF_3	3-SCF_3	CF_3	4-SCF_3
CF_3	2-$SOCF_3$	CF_3	3-$SOCF_3$	CF_3	4-$SOCF_3$
CF_3	2-SO_2CF_3	CF_3	3-SO_2CF_3	CF_3	4-SO_2CF_3
CF_3	2-SCF_2H	CF_3	3-SCF_2H	CF_3	4-SCF_2H
CF_3	2-$SOCF_2H$	CF_3	3-$SOCF_2H$	CF_3	4-$SOCF_2H$
CF_3	2-SO_2CF_2H	CF_3	3-SO_2CF_2H	CF_3	4-SO_2CF_2H
OCF_2H	2-CF_3	OCF_2H	3-CF_3	OCF_2H	4-CF_3
OCF_2H	2-OCF_3	OCF_2H	3-OCF_3	OCF_2H	4-OCF_3
OCF_2H	2-OCF_2H	OCF_2H	3-OCF_2H	OCF_2H	4-OCF_2H
OCF_2H	2-OCF_2CF_2H	OCF_2H	3-OCF_2CF_2H	OCF_2H	4-OCF_2CF_2H
OCF_2H	2-OCH_2CF_3	OCF_2H	3-OCH_2CF_3	OCF_2H	4-OCH_2CF_3
OCF_2H	2-SCF_3	OCF_2H	3-SCF_3	OCF_2H	4-SCF_3
OCF_2H	2-$SOCF_3$	OCF_2H	3-$SOCF_3$	OCF_2H	4-$SOCF_3$
OCF_2H	2-SO_2CF_3	OCF_2H	3-SO_2CF_3	OCF_2H	4-SO_2CF_3
OCF_2H	2-SCF_2H	OCF_2H	3-SCF_2H	OCF_2H	4-SCF_2H
OCF_2H	2-$SOCF_2H$	OCF_2H	3-$SOCF_2H$	OCF_2H	4-$SOCF_2H$
OCF_2H	2-SO_2CF_2H	OCF_2H	3-SO_2CF_2H	OCF_2H	4-SO_2CF_2H
Me	2-Me-4-CF_3	F	2-Me-4-CF_3	Cl	2-Me-4-CF_3
Me	2-Me-4-OCF_3	F	2-Me-4-OCF_3	Cl	2-Me-4-OCF_3
Me	2-Me-4-OCF_2H	F	2-Me-4-OCF_2H	Cl	2-Me-4-OCF_2H
Me	2-Me-4-OCH_2CF_3	F	2-Me-4-OCH_2CF_3	Cl	2-Me-4-OCH_2CF_3

Me	2-Me-4-SCF_3	F	2-Me-4-SCF_3	Cl	2-Me-4-SCF_3
Me	2-Me-4-$SOCF_3$	F	2-Me-4-$SOCF_3$	Cl	2-Me-4-$SOCF_3$
Me	2-Me-4-SO_2CF_3	F	2-Me-4-SO_2CF_3	Cl	2-Me-4-SO_2CF_3
Me	2-Me-4-SCF_2H	F	2-Me-4-SCF_2H	Cl	2-Me-4-SCF_2H
Me	2-Me-4-$SOCF_2H$	F	2-Me-4-$SOCF_2H$	Cl	2-Me-4-$SOCF_2H$
Me	2-Me-4-SO_2CF_2H	F	2-Me-4-SO_2CF_2H	Cl	2-Me-4-SO_2CF_2H
Br	2-Me-4-CF_3	I	2-Me-4-CF_3	OMe	2-Me-4-CF_3
Br	2-Me-4-OCF_3	I	2-Me-4-OCF_3	OMe	2-Me-4-OCF_3
Br	2-Me-4-OCF_2H	I	2-Me-4-OCF_2H	OMe	2-Me-4-OCF_2H
Br	2-Me-4-OCH_2CF_3	I	2-Me-4-OCH_2CF_3	OMe	2-Me-4-OCH_2CF_3
Br	2-Me-4-SCF_3	I	2-Me-4-SCF_3	OMe	2-Me-4-SCF_3
Br	2-Me-4-$SOCF_3$	I	2-Me-4-$SOCF_3$	OMe	2-Me-4-$SOCF_3$
Br	2-Me-4-SO_2CF_3	I	2-Me-4-SO_2CF_3	OMe	2-Me-4-SO_2CF_3
Br	2-Me-4-SCF_2H	I	2-Me-4-SCF_2H	OMe	2-Me-4-SCF_2H
Br	2-Me-4-$SOCF_2H$	I	2-Me-4-$SOCF_2H$	OMe	2-Me-4-$SOCF_2H$
Br	2-Me-4-SO_2CF_2H	I	2-Me-4-SO_2CF_2H	OMe	2-Me-4-SO_2CF_2H
CF_3	2-Me-4-CF_3	NO_2	2-Me-4-CF_3	SMe	2-Me-4-CF_3
CF_3	2-Me-4-OCF_3	NO_2	2-Me-4-OCF_3	SMe	2-Me-4-OCF_3
CF_3	2-Me-4-OCF_2H	NO_2	2-Me-4-OCF_2H	SMe	2-Me-4-OCF_2H
CF_3	2-Me-4-OCH_2CF_3	NO_2	2-Me-4-OCH_2CF_3	SMe	2-Me-4-OCH_2CF_3
CF_3	2-Me-4-SCF_3	NO_2	2-Me-4-SCF_3	SMe	2-Me-4-SCF_3
CF_3	2-Me-4-$SOCF_3$	NO_2	2-Me-4-$SOCF_3$	SMe	2-Me-4-$SOCF_3$
CF_3	2-Me-4-SO_2CF_3	NO_2	2-Me-4-SO_2CF_3	SMe	2-Me-4-SO_2CF_3
CF_3	2-Me-4-SCF_2H	NO_2	2-Me-4-SCF_2H	SMe	2-Me-4-SCF_2H
CF_3	2-Me-4-$SOCF_2H$	NO_2	2-Me-4-$SOCF_2H$	SMe	2-Me-4-$SOCF_2H$
CF_3	2-Me-4-SO_2CF_2H	NO_2	2-Me-4-SO_2CF_2H	SMe	2-Me-4-SO_2CF_2H

Table 32



R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}
Me	2-CF_3	Me	3-CF_3	Me	4-CF_3
Me	2-OCF_3	Me	3-OCF_3	Me	4-OCF_3
Me	2-OCF_2H	Me	3-OCF_2H	Me	4-OCF_2H

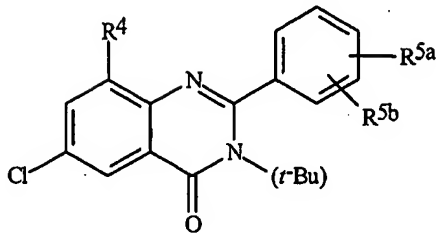
Me	2-OCF_2CF_2H	Me	3-OCF_2CF_2H	Me	4-OCF_2CF_2H
Me	2-OCH_2CF_3	Me	3-OCH_2CF_3	Me	4-OCH_2CF_3
Me	2-SCF_3	Me	3-SCF_3	Me	4-SCF_3
Me	2-$SOCF_3$	Me	3-$SOCF_3$	Me	4-$SOCF_3$
Me	2-SO_2CF_3	Me	3-SO_2CF_3	Me	4-SO_2CF_3
Me	2-SCF_2H	Me	3-SCF_2H	Me	4-SCF_2H
Me	2-$SOCF_2H$	Me	3-$SOCF_2H$	Me	4-$SOCF_2H$
Me	2-SO_2CF_2H	Me	3-SO_2CF_2H	Me	4-SO_2CF_2H
Cl	2-CF_3	Cl	3-CF_3	Cl	4-CF_3
Cl	2-OCF_3	Cl	3-OCF_3	Cl	4-OCF_3
Cl	2-OCF_2H	Cl	3-OCF_2H	Cl	4-OCF_2H
Cl	2-OCF_2CF_2H	Cl	3-OCF_2CF_2H	Cl	4-OCF_2CF_2H
Cl	2-OCH_2CF_3	Cl	3-OCH_2CF_3	Cl	4-OCH_2CF_3
Cl	2-SCF_3	Cl	3-SCF_3	Cl	4-SCF_3
Cl	2-$SOCF_3$	Cl	3-$SOCF_3$	Cl	4-$SOCF_3$
Cl	2-SO_2CF_3	Cl	3-SO_2CF_3	Cl	4-SO_2CF_3
Cl	2-SCF_2H	Cl	3-SCF_2H	Cl	4-SCF_2H
Cl	2-$SOCF_2H$	Cl	3-$SOCF_2H$	Cl	4-$SOCF_2H$
Cl	2-SO_2CF_2H	Cl	3-SO_2CF_2H	Cl	4-SO_2CF_2H
F	2-CF_3	F	3-CF_3	F	4-CF_3
F	2-OCF_3	F	3-OCF_3	F	4-OCF_3
F	2-OCF_2H	F	3-OCF_2H	F	4-OCF_2H
F	2-OCF_2CF_2H	F	3-OCF_2CF_2H	F	4-OCF_2CF_2H
F	2-OCH_2CF_3	F	3-OCH_2CF_3	F	4-OCH_2CF_3
F	2-SCF_3	F	3-SCF_3	F	4-SCF_3
F	2-$SOCF_3$	F	3-$SOCF_3$	F	4-$SOCF_3$
F	2-SO_2CF_3	F	3-SO_2CF_3	F	4-SO_2CF_3
F	2-SCF_2H	F	3-SCF_2H	F	4-SCF_2H
F	2-$SOCF_2H$	F	3-$SOCF_2H$	F	4-$SOCF_2H$
F	2-SO_2CF_2H	F	3-SO_2CF_2H	F	4-SO_2CF_2H
Br	2-CF_3	Br	3-CF_3	Br	4-CF_3
Br	2-OCF_3	Br	3-OCF_3	Br	4-OCF_3
Br	2-OCF_2H	Br	3-OCF_2H	Br	4-OCF_2H
Br	2-OCF_2CF_2H	Br	3-OCF_2CF_2H	Br	4-OCF_2CF_2H
Br	2-OCH_2CF_3	Br	3-OCH_2CF_3	Br	4-OCH_2CF_3
Br	2-SCF_3	Br	3-SCF_3	Br	4-SCF_3
Br	2-$SOCF_3$	Br	3-$SOCF_3$	Br	4-$SOCF_3$
Br	2-SO_2CF_3	Br	3-SO_2CF_3	Br	4-SO_2CF_3

Br	2-SCF_2H	Br	3-SCF_2H	Br	4-SCF_2H
Br	2-$SOCF_2H$	Br	3-$SOCF_2H$	Br	4-$SOCF_2H$
Br	2-SO_2CF_2H	Br	3-SO_2CF_2H	Br	4-SO_2CF_2H
I	2-CF_3	I	3-CF_3	I	4-CF_3
I	2-OCF_3	I	3-OCF_3	I	4-OCF_3
I	2-OCF_2H	I	3-OCF_2H	I	4-OCF_2H
I	2-OCF_2CF_2H	I	3-OCF_2CF_2H	I	4-OCF_2CF_2H
I	2-OCH_2CF_3	I	3-OCH_2CF_3	I	4-OCH_2CF_3
I	2-SCF_3	I	3-SCF_3	I	4-SCF_3
I	2-$SOCF_3$	I	3-$SOCF_3$	I	4-$SOCF_3$
I	2-SO_2CF_3	I	3-SO_2CF_3	I	4-SO_2CF_3
I	2-SCF_2H	I	3-SCF_2H	I	4-SCF_2H
I	2-$SOCF_2H$	I	3-$SOCF_2H$	I	4-$SOCF_2H$
I	2-SO_2CF_2H	I	3-SO_2CF_2H	I	4-SO_2CF_2H
OMe	2-CF_3	OMe	3-CF_3	OMe	4-CF_3
OMe	2-OCF_3	OMe	3-OCF_3	OMe	4-OCF_3
OMe	2-OCF_2H	OMe	3-OCF_2H	OMe	4-OCF_2H
OMe	2-OCF_2CF_2H	OMe	3-OCF_2CF_2H	OMe	4-OCF_2CF_2H
OMe	2-OCH_2CF_3	OMe	3-OCH_2CF_3	OMe	4-OCH_2CF_3
OMe	2-SCF_3	OMe	3-SCF_3	OMe	4-SCF_3
OMe	2-$SOCF_3$	OMe	3-$SOCF_3$	OMe	4-$SOCF_3$
OMe	2-SO_2CF_3	OMe	3-SO_2CF_3	OMe	4-SO_2CF_3
OMe	2-SCF_2H	OMe	3-SCF_2H	OMe	4-SCF_2H
OMe	2-$SOCF_2H$	OMe	3-$SOCF_2H$	OMe	4-$SOCF_2H$
OMe	2-SO_2CF_2H	OMe	3-SO_2CF_2H	OMe	4-SO_2CF_2H
CF_3	2-CF_3	CF_3	3-CF_3	CF_3	4-CF_3
CF_3	2-OCF_3	CF_3	3-OCF_3	CF_3	4-OCF_3
CF_3	2-OCF_2H	CF_3	3-OCF_2H	CF_3	4-OCF_2H
CF_3	2-OCF_2CF_2H	CF_3	3-OCF_2CF_2H	CF_3	4-OCF_2CF_2H
CF_3	2-OCH_2CF_3	CF_3	3-OCH_2CF_3	CF_3	4-OCH_2CF_3
CF_3	2-SCF_3	CF_3	3-SCF_3	CF_3	4-SCF_3
CF_3	2-$SOCF_3$	CF_3	3-$SOCF_3$	CF_3	4-$SOCF_3$
CF_3	2-SO_2CF_3	CF_3	3-SO_2CF_3	CF_3	4-SO_2CF_3
CF_3	2-SCF_2H	CF_3	3-SCF_2H	CF_3	4-SCF_2H
CF_3	2-$SOCF_2H$	CF_3	3-$SOCF_2H$	CF_3	4-$SOCF_2H$
CF_3	2-SO_2CF_2H	CF_3	3-SO_2CF_2H	CF_3	4-SO_2CF_2H
OCF_2H	2-CF_3	OCF_2H	3-CF_3	OCF_2H	4-CF_3
OCF_2H	2-OCF_3	OCF_2H	3-OCF_3	OCF_2H	4-OCF_3

OCF_2H	2-OCF_2H	OCF_2H	3-OCF_2H	OCF_2H	4-OCF_2H
OCF_2H	2-OCF_2CF_2H	OCF_2H	3-OCF_2CF_2H	OCF_2H	4-OCF_2CF_2H
OCF_2H	2-OCH_2CF_3	OCF_2H	3-OCH_2CF_3	OCF_2H	4-OCH_2CF_3
OCF_2H	2-SCF_3	OCF_2H	3-SCF_3	OCF_2H	4-SCF_3
OCF_2H	2-$SOCF_3$	OCF_2H	3-$SOCF_3$	OCF_2H	4-$SOCF_3$
OCF_2H	2-SO_2CF_3	OCF_2H	3-SO_2CF_3	OCF_2H	4-SO_2CF_3
OCF_2H	2-SCF_2H	OCF_2H	3-SCF_2H	OCF_2H	4-SCF_2H
OCF_2H	2-$SOCF_2H$	OCF_2H	3-$SOCF_2H$	OCF_2H	4-$SOCF_2H$
OCF_2H	2-SO_2CF_2H	OCF_2H	3-SO_2CF_2H	OCF_2H	4-SO_2CF_2H
Me	2-Me-4-CF_3	F	2-Me-4-CF_3	Cl	2-Me-4-CF_3
Me	2-Me-4-OCF_3	F	2-Me-4-OCF_3	Cl	2-Me-4-OCF_3
Me	2-Me-4-OCF_2H	F	2-Me-4-OCF_2H	Cl	2-Me-4-OCF_2H
Me	2-Me-4-OCH_2CF_3	F	2-Me-4-OCH_2CF_3	Cl	2-Me-4-OCH_2CF_3
Me	2-Me-4-SCF_3	F	2-Me-4-SCF_3	Cl	2-Me-4-SCF_3
Me	2-Me-4-$SOCF_3$	F	2-Me-4-$SOCF_3$	Cl	2-Me-4-$SOCF_3$
Me	2-Me-4-SO_2CF_3	F	2-Me-4-SO_2CF_3	Cl	2-Me-4-SO_2CF_3
Me	2-Me-4-SCF_2H	F	2-Me-4-SCF_2H	Cl	2-Me-4-SCF_2H
Me	2-Me-4-$SOCF_2H$	F	2-Me-4-$SOCF_2H$	Cl	2-Me-4-$SOCF_2H$
Me	2-Me-4-SO_2CF_2H	F	2-Me-4-SO_2CF_2H	Cl	2-Me-4-SO_2CF_2H
Br	2-Me-4-CF_3	I	2-Me-4-CF_3	OMe	2-Me-4-CF_3
Br	2-Me-4-OCF_3	I	2-Me-4-OCF_3	OMe	2-Me-4-OCF_3
Br	2-Me-4-OCF_2H	I	2-Me-4-OCF_2H	OMe	2-Me-4-OCF_2H
Br	2-Me-4-OCH_2CF_3	I	2-Me-4-OCH_2CF_3	OMe	2-Me-4-OCH_2CF_3
Br	2-Me-4-SCF_3	I	2-Me-4-SCF_3	OMe	2-Me-4-SCF_3
Br	2-Me-4-$SOCF_3$	I	2-Me-4-$SOCF_3$	OMe	2-Me-4-$SOCF_3$
Br	2-Me-4-SO_2CF_3	I	2-Me-4-SO_2CF_3	OMe	2-Me-4-SO_2CF_3
Br	2-Me-4-SCF_2H	I	2-Me-4-SCF_2H	OMe	2-Me-4-SCF_2H
Br	2-Me-4-$SOCF_2H$	I	2-Me-4-$SOCF_2H$	OMe	2-Me-4-$SOCF_2H$
Br	2-Me-4-SO_2CF_2H	I	2-Me-4-SO_2CF_2H	OMe	2-Me-4-SO_2CF_2H
CF_3	2-Me-4-CF_3	NO_2	2-Me-4-CF_3	SMe	2-Me-4-CF_3
CF_3	2-Me-4-OCF_3	NO_2	2-Me-4-OCF_3	SMe	2-Me-4-OCF_3
CF_3	2-Me-4-OCF_2H	NO_2	2-Me-4-OCF_2H	SMe	2-Me-4-OCF_2H
CF_3	2-Me-4-OCH_2CF_3	NO_2	2-Me-4-OCH_2CF_3	SMe	2-Me-4-OCH_2CF_3
CF_3	2-Me-4-SCF_3	NO_2	2-Me-4-SCF_3	SMe	2-Me-4-SCF_3
CF_3	2-Me-4-$SOCF_3$	NO_2	2-Me-4-$SOCF_3$	SMe	2-Me-4-$SOCF_3$
CF_3	2-Me-4-SO_2CF_3	NO_2	2-Me-4-SO_2CF_3	SMe	2-Me-4-SO_2CF_3
CF_3	2-Me-4-SCF_2H	NO_2	2-Me-4-SCF_2H	SMe	2-Me-4-SCF_2H
CF_3	2-Me-4-$SOCF_2H$	NO_2	2-Me-4-$SOCF_2H$	SMe	2-Me-4-$SOCF_2H$

CF_3	2-Me-4-SO_2CF_2H	NO_2	2-Me-4-SO_2CF_2H	SMe	2-Me-4-SO_2CF_2H

Table 33



R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}	R^4	R^{5a} and/or R^{5b}
Me	2-CF_3	Me	3-CF_3	Me	4-CF_3
Me	2-OCF_3	Me	3-OCF_3	Me	4-OCF_3
Me	2-OCF_2H	Me	3-OCF_2H	Me	4-OCF_2H
Me	2-OCF_2CF_2H	Me	3-OCF_2CF_2H	Me	4-OCF_2CF_2H
Me	2-OCH_2CF_3	Me	3-OCH_2CF_3	Me	4-OCH_2CF_3
Me	2-SCF_3	Me	3-SCF_3	Me	4-SCF_3
Me	2-$SOCF_3$	Me	3-$SOCF_3$	Me	4-$SOCF_3$
Me	2-SO_2CF_3	Me	3-SO_2CF_3	Me	4-SO_2CF_3
Me	2-SCF_2H	Me	3-SCF_2H	Me	4-SCF_2H
Me	2-$SOCF_2H$	Me	3-$SOCF_2H$	Me	4-$SOCF_2H$
Me	2-SO_2CF_2H	Me	3-SO_2CF_2H	Me	4-SO_2CF_2H
Cl	2-CF_3	Cl	3-CF_3	Cl	4-CF_3
Cl	2-OCF_3	Cl	3-OCF_3	Cl	4-OCF_3
Cl	2-OCF_2H	Cl	3-OCF_2H	Cl	4-OCF_2H
Cl	2-OCF_2CF_2H	Cl	3-OCF_2CF_2H	Cl	4-OCF_2CF_2H
Cl	2-OCH_2CF_3	Cl	3-OCH_2CF_3	Cl	4-OCH_2CF_3
Cl	2-SCF_3	Cl	3-SCF_3	Cl	4-SCF_3
Cl	2-$SOCF_3$	Cl	3-$SOCF_3$	Cl	4-$SOCF_3$
Cl	2-SO_2CF_3	Cl	3-SO_2CF_3	Cl	4-SO_2CF_3
Cl	2-SCF_2H	Cl	3-SCF_2H	Cl	4-SCF_2H
Cl	2-$SOCF_2H$	Cl	3-$SOCF_2H$	Cl	4-$SOCF_2H$
Cl	2-SO_2CF_2H	Cl	3-SO_2CF_2H	Cl	4-SO_2CF_2H
F	2-CF_3	F	3-CF_3	F	4-CF_3
F	2-OCF_3	F	3-OCF_3	F	4-OCF_3
F	2-OCF_2H	F	3-OCF_2H	F	4-OCF_2H
F	2-OCF_2CF_2H	F	3-OCF_2CF_2H	F	4-OCF_2CF_2H
F	2-OCH_2CF_3	F	3-OCH_2CF_3	F	4-OCH_2CF_3
F	2-SCF_3	F	3-SCF_3	F	4-SCF_3

F	2-$SOCF_3$	F	3-$SOCF_3$	F	4-$SOCF_3$
F	2-SO_2CF_3	F	3-SO_2CF_3	F	4-SO_2CF_3
F	2-SCF_2H	F	3-SCF_2H	F	4-SCF_2H
F	2-$SOCF_2H$	F	3-$SOCF_2H$	F	4-$SOCF_2H$
F	2-SO_2CF_2H	F	3-SO_2CF_2H	F	4-SO_2CF_2H
Br	2-CF_3	Br	3-CF_3	Br	4-CF_3
Br	2-OCF_3	Br	3-OCF_3	Br	4-OCF_3
Br	2-OCF_2H	Br	3-OCF_2H	Br	4-OCF_2H
Br	2-OCF_2CF_2H	Br	3-OCF_2CF_2H	Br	4-OCF_2CF_2H
Br	2-OCH_2CF_3	Br	3-OCH_2CF_3	Br	4-OCH_2CF_3
Br	2-SCF_3	Br	3-SCF_3	Br	4-SCF_3
Br	2-$SOCF_3$	Br	3-$SOCF_3$	Br	4-$SOCF_3$
Br	2-SO_2CF_3	Br	3-SO_2CF_3	Br	4-SO_2CF_3
Br	2-SCF_2H	Br	3-SCF_2H	Br	4-SCF_2H
Br	2-$SOCF_2H$	Br	3-$SOCF_2H$	Br	4-$SOCF_2H$
Br	2-SO_2CF_2H	Br	3-SO_2CF_2H	Br	4-SO_2CF_2H
I	2-CF_3	I	3-CF_3	I	4-CF_3
I	2-OCF_3	I	3-OCF_3	I	4-OCF_3
I	2-OCF_2H	I	3-OCF_2H	I	4-OCF_2H
I	2-OCF_2CF_2H	I	3-OCF_2CF_2H	I	4-OCF_2CF_2H
I	2-OCH_2CF_3	I	3-OCH_2CF_3	I	4-OCH_2CF_3
I	2-SCF_3	I	3-SCF_3	I	4-SCF_3
I	2-$SOCF_3$	I	3-$SOCF_3$	I	4-$SOCF_3$
I	2-SO_2CF_3	I	3-SO_2CF_3	I	4-SO_2CF_3
I	2-SCF_2H	I	3-SCF_2H	I	4-SCF_2H
I	2-$SOCF_2H$	I	3-$SOCF_2H$	I	4-$SOCF_2H$
I	2-SO_2CF_2H	I	3-SO_2CF_2H	I	4-SO_2CF_2H
OMe	2-CF_3	OMe	3-CF_3	OMe	4-CF_3
OMe	2-OCF_3	OMe	3-OCF_3	OMe	4-OCF_3
OMe	2-OCF_2H	OMe	3-OCF_2H	OMe	4-OCF_2H
OMe	2-OCF_2CF_2H	OMe	3-OCF_2CF_2H	OMe	4-OCF_2CF_2H
OMe	2-OCH_2CF_3	OMe	3-OCH_2CF_3	OMe	4-OCH_2CF_3
OMe	2-SCF_3	OMe	3-SCF_3	OMe	4-SCF_3
OMe	2-$SOCF_3$	OMe	3-$SOCF_3$	OMe	4-$SOCF_3$
OMe	2-SO_2CF_3	OMe	3-SO_2CF_3	OMe	4-SO_2CF_3
OMe	2-SCF_2H	OMe	3-SCF_2H	OMe	4-SCF_2H
OMe	2-$SOCF_2H$	OMe	3-$SOCF_2H$	OMe	4-$SOCF_2H$
OMe	2-SO_2CF_2H	OMe	3-SO_2CF_2H	OMe	4-SO_2CF_2H

CF_3	2-CF_3	CF_3	3-CF_3	CF_3	4-CF_3
CF_3	2-OCF_3	CF_3	3-OCF_3	CF_3	4-OCF_3
CF_3	2-OCF_2H	CF_3	3-OCF_2H	CF_3	4-OCF_2H
CF_3	2-OCF_2CF_2H	CF_3	3-OCF_2CF_2H	CF_3	4-OCF_2CF_2H
CF_3	2-OCH_2CF_3	CF_3	3-OCH_2CF_3	CF_3	4-OCH_2CF_3
CF_3	2-SCF_3	CF_3	3-SCF_3	CF_3	4-SCF_3
CF_3	2-$SOCF_3$	CF_3	3-$SOCF_3$	CF_3	4-$SOCF_3$
CF_3	2-SO_2CF_3	CF_3	3-SO_2CF_3	CF_3	4-SO_2CF_3
CF_3	2-SCF_2H	CF_3	3-SCF_2H	CF_3	4-SCF_2H
CF_3	2-$SOCF_2H$	CF_3	3-$SOCF_2H$	CF_3	4-$SOCF_2H$
CF_3	2-SO_2CF_2H	CF_3	3-SO_2CF_2H	CF_3	4-SO_2CF_2H
OCF_2H	2-CF_3	OCF_2H	3-CF_3	OCF_2H	4-CF_3
OCF_2H	2-OCF_3	OCF_2H	3-OCF_3	OCF_2H	4-OCF_3
OCF_2H	2-OCF_2H	OCF_2H	3-OCF_2H	OCF_2H	4-OCF_2H
OCF_2H	2-OCF_2CF_2H	OCF_2H	3-OCF_2CF_2H	OCF_2H	4-OCF_2CF_2H
OCF_2H	2-OCH_2CF_3	OCF_2H	3-OCH_2CF_3	OCF_2H	4-OCH_2CF_3
OCF_2H	2-SCF_3	OCF_2H	3-SCF_3	OCF_2H	4-SCF_3
OCF_2H	2-$SOCF_3$	OCF_2H	3-$SOCF_3$	OCF_2H	4-$SOCF_3$
OCF_2H	2-SO_2CF_3	OCF_2H	3-SO_2CF_3	OCF_2H	4-SO_2CF_3
OCF_2H	2-SCF_2H	OCF_2H	3-SCF_2H	OCF_2H	4-SCF_2H
OCF_2H	2-$SOCF_2H$	OCF_2H	3-$SOCF_2H$	OCF_2H	4-$SOCF_2H$
OCF_2H	2-SO_2CF_2H	OCF_2H	3-SO_2CF_2H	OCF_2H	4-SO_2CF_2H
Me	2-Me-4-CF_3	F	2-Me-4-CF_3	Cl	2-Me-4-CF_3
Me	2-Me-4-OCF_3	F	2-Me-4-OCF_3	Cl	2-Me-4-OCF_3
Me	2-Me-4-OCF_2H	F	2-Me-4-OCF_2H	Cl	2-Me-4-OCF_2H
Me	2-Me-4-OCH_2CF_3	F	2-Me-4-OCH_2CF_3	Cl	2-Me-4-OCH_2CF_3
Me	2-Me-4-SCF_3	F	2-Me-4-SCF_3	Cl	2-Me-4-SCF_3
Me	2-Me-4-$SOCF_3$	F	2-Me-4-$SOCF_3$	Cl	2-Me-4-$SOCF_3$
Me	2-Me-4-SO_2CF_3	F	2-Me-4-SO_2CF_3	Cl	2-Me-4-SO_2CF_3
Me	2-Me-4-SCF_2H	F	2-Me-4-SCF_2H	Cl	2-Me-4-SCF_2H
Me	2-Me-4-$SOCF_2H$	F	2-Me-4-$SOCF_2H$	Cl	2-Me-4-$SOCF_2H$
Me	2-Me-4-SO_2CF_2H	F	2-Me-4-SO_2CF_2H	Cl	2-Me-4-SO_2CF_2H
Br	2-Me-4-CF_3	I	2-Me-4-CF_3	OMe	2-Me-4-CF_3
Br	2-Me-4-OCF_3	I	2-Me-4-OCF_3	OMe	2-Me-4-OCF_3
Br	2-Me-4-OCF_2H	I	2-Me-4-OCF_2H	OMe	2-Me-4-OCF_2H
Br	2-Me-4-OCH_2CF_3	I	2-Me-4-OCH_2CF_3	OMe	2-Me-4-OCH_2CF_3
Br	2-Me-4-SCF_3	I	2-Me-4-SCF_3	OMe	2-Me-4-SCF_3
Br	2-Me-4-$SOCF_3$	I	2-Me-4-$SOCF_3$	OMe	2-Me-4-$SOCF_3$

Br	2-Me-4-SO_2CF_3	I	2-Me-4-SO_2CF_3	OMe	2-Me-4-SO_2CF_3
Br	2-Me-4-SCF_2H	I	2-Me-4-SCF_2H	OMe	2-Me-4-SCF_2H
Br	2-Me-4-$SOCF_2H$	I	2-Me-4-$SOCF_2H$	OMe	2-Me-4-$SOCF_2H$
Br	2-Me-4-SO_2CF_2H	I	2-Me-4-SO_2CF_2H	OMe	2-Me-4-SO_2CF_2H
CF_3	2-Me-4-CF_3	NO_2	2-Me-4-CF_3	SMe	2-Me-4-CF_3
CF_3	2-Me-4-OCF_3	NO_2	2-Me-4-OCF_3	SMe	2-Me-4-OCF_3
CF_3	2-Me-4-OCF_2H	NO_2	2-Me-4-OCF_2H	SMe	2-Me-4-OCF_2H
CF_3	2-Me-4-OCH_2CF_3	NO_2	2-Me-4-OCH_2CF_3	SMe	2-Me-4-OCH_2CF_3
CF_3	2-Me-4-SCF_3	NO_2	2-Me-4-SCF_3	SMe	2-Me-4-SCF_3
CF_3	2-Me-4-$SOCF_3$	NO_2	2-Me-4-$SOCF_3$	SMe	2-Me-4-$SOCF_3$
CF_3	2-Me-4-SO_2CF_3	NO_2	2-Me-4-SO_2CF_3	SMe	2-Me-4-SO_2CF_3
CF_3	2-Me-4-SCF_2H	NO_2	2-Me-4-SCF_2H	SMe	2-Me-4-SCF_2H
CF_3	2-Me-4-$SOCF_2H$	NO_2	2-Me-4-$SOCF_2H$	SMe	2-Me-4-$SOCF_2H$
CF_3	2-Me-4-SO_2CF_2H	NO_2	2-Me-4-SO_2CF_2H	SMe	2-Me-4-SO_2CF_2H

Formulation/Utility

Compounds of this invention will generally be used as a formulation or composition with an agriculturally suitable carrier comprising at least one of a liquid diluent, a solid diluent or a surfactant. The formulation or composition ingredients are selected to be consistent with the physical properties of the active ingredient, mode of application and environmental factors such as soil type, moisture and temperature. Useful formulations include liquids such as solutions (including emulsifiable concentrates), suspensions, emulsions (including microemulsions and/or suspoemulsions) and the like which optionally can be thickened into gels. Useful formulations further include solids such as dusts, powders, granules, pellets, tablets, films, and the like which can be water-dispersible ("wettable") or water-soluble. Active ingredient can be (micro)encapsulated and further formed into a suspension or solid formulation; alternatively the entire formulation of active ingredient can be encapsulated (or "overcoated"). Encapsulation can control or delay release of the active ingredient. Sprayable formulations can be extended in suitable media and used at spray volumes from about one to several hundred liters per hectare. High-strength compositions are primarily used as intermediates for further formulation.

The formulations will typically contain effective amounts of active ingredient, diluent and surfactant within the following approximate ranges that add up to 100 percent by weight.

	Weight Percent		
	Active Ingredient	Diluent	Surfactant
Water-Dispersible and Water-soluble Granules, Tablets and Powders.	5–90	0–94	1–15
Suspensions, Emulsions, Solutions (including Emulsifiable Concentrates)	5–50	40–95	0–15
Dusts	1–25	70–99	0–5
Granules and Pellets	0.01–99	5–99.99	0–15
High Strength Compositions	90–99	0–10	0–2

Typical solid diluents are described in Watkins, et al., *Handbook of Insecticide Dust Diluents and Carriers*, 2nd Ed., Dorland Books, Caldwell, New Jersey. Typical liquid diluents are described in Marsden, *Solvents Guide*, 2nd Ed., Interscience, New York, 1950. *McCutcheon's Detergents and Emulsifiers Annual*, Allured Publ. Corp., Ridgewood, New Jersey, as well as Sisely and Wood, *Encyclopedia of Surface Active Agents*, Chemical Publ. Co., Inc., New York, 1964, list surfactants and recommended uses. All formulations can contain minor amounts of additives to reduce foam, caking, corrosion, microbiological growth and the like, or thickeners to increase viscosity.

Surfactants include, for example, polyethoxylated alcohols, polyethoxylated alkylphenols, polyethoxylated sorbitan fatty acid esters, dialkyl sulfosuccinates, alkyl sulfates, alkylbenzene sulfonates, organosilicones, *N,N*-dialkyltaurates, lignin sulfonates, naphthalene sulfonate formaldehyde condensates, polycarboxylates, and polyoxyethylene/polyoxypropylene block copolymers. Solid diluents include, for example, clays such as bentonite, montmorillonite, attapulgite and kaolin, starch, sugar, silica, talc, diatomaceous earth, urea, calcium carbonate, sodium carbonate and bicarbonate, and sodium sulfate. Liquid diluents include, for example, water, *N,N*-dimethylformamide, dimethyl sulfoxide, *N*-alkylpyrrolidone, ethylene glycol, polypropylene glycol, paraffins, alkylbenzenes, alkylnaphthalenes, oils of olive, castor, linseed, tung, sesame, corn, peanut, cotton-seed, soybean, rape-seed and coconut, fatty acid esters, ketones such as cyclohexanone, 2-heptanone, isophorone and 4-hydroxy-4-methyl-2-pentanone, and alcohols such as methanol, cyclohexanol, decanol and tetrahydrofurfuryl alcohol.

Solutions, including emulsifiable concentrates, can be prepared by simply mixing the ingredients. Dusts and powders can be prepared by blending and, usually, grinding as in a hammer mill or fluid-energy mill. Suspensions are usually prepared by wet-milling; see, for example, U.S. 3,060,084. Granules and pellets can be prepared by spraying the active material upon preformed granular carriers or by agglomeration techniques. See Browning, "Agglomeration", *Chemical Engineering*, December 4, 1967, pp 147–48, *Perry's Chemical*

Br	2-Me-4-SO_2CF_3	I	2-Me-4-SO_2CF_3	OMe	2-Me-4-SO_2CF_3
Br	2-Me-4-SCF_2H	I	2-Me-4-SCF_2H	OMe	2-Me-4-SCF_2H
Br	2-Me-4-$SOCF_2H$	I	2-Me-4-$SOCF_2H$	OMe	2-Me-4-$SOCF_2H$
Br	2-Me-4-SO_2CF_2H	I	2-Me-4-SO_2CF_2H	OMe	2-Me-4-SO_2CF_2H
CF_3	2-Me-4-CF_3	NO_2	2-Me-4-CF_3	SMe	2-Me-4-CF_3
CF_3	2-Me-4-OCF_3	NO_2	2-Me-4-OCF_3	SMe	2-Me-4-OCF_3
CF_3	2-Me-4-OCF_2H	NO_2	2-Me-4-OCF_2H	SMe	2-Me-4-OCF_2H
CF_3	2-Me-4-OCH_2CF_3	NO_2	2-Me-4-OCH_2CF_3	SMe	2-Me-4-OCH_2CF_3
CF_3	2-Me-4-SCF_3	NO_2	2-Me-4-SCF_3	SMe	2-Me-4-SCF_3
CF_3	2-Me-4-$SOCF_3$	NO_2	2-Me-4-$SOCF_3$	SMe	2-Me-4-$SOCF_3$
CF_3	2-Me-4-SO_2CF_3	NO_2	2-Me-4-SO_2CF_3	SMe	2-Me-4-SO_2CF_3
CF_3	2-Me-4-SCF_2H	NO_2	2-Me-4-SCF_2H	SMe	2-Me-4-SCF_2H
CF_3	2-Me-4-$SOCF_2H$	NO_2	2-Me-4-$SOCF_2H$	SMe	2-Me-4-$SOCF_2H$
CF_3	2-Me-4-SO_2CF_2H	NO_2	2-Me-4-SO_2CF_2H	SMe	2-Me-4-SO_2CF_2H

Formulation/Utility

Compounds of this invention will generally be used as a formulation or composition with an agriculturally suitable carrier comprising at least one of a liquid diluent, a solid diluent or a surfactant. The formulation or composition ingredients are selected to be consistent with the physical properties of the active ingredient, mode of application and environmental factors such as soil type, moisture and temperature. Useful formulations include liquids such as solutions (including emulsifiable concentrates), suspensions, emulsions (including microemulsions and/or suspoemulsions) and the like which optionally can be thickened into gels. Useful formulations further include solids such as dusts, powders, granules, pellets, tablets, films, and the like which can be water-dispersible ("wettable") or water-soluble. Active ingredient can be (micro)encapsulated and further formed into a suspension or solid formulation; alternatively the entire formulation of active ingredient can be encapsulated (or "overcoated"). Encapsulation can control or delay release of the active ingredient. Sprayable formulations can be extended in suitable media and used at spray volumes from about one to several hundred liters per hectare. High-strength compositions are primarily used as intermediates for further formulation.

The formulations will typically contain effective amounts of active ingredient, diluent and surfactant within the following approximate ranges that add up to 100 percent by weight.

	Weight Percent		
	Active Ingredient	Diluent	Surfactant
Water-Dispersible and Water-soluble Granules, Tablets and Powders.	5–90	0–94	1–15
Suspensions, Emulsions, Solutions (including Emulsifiable Concentrates)	5–50	40–95	0–15
Dusts	1–25	70–99	0–5
Granules and Pellets	0.01–99	5–99.99	0–15
High Strength Compositions	90–99	0–10	0–2

Typical solid diluents are described in Watkins, et al., *Handbook of Insecticide Dust Diluents and Carriers*, 2nd Ed., Dorland Books, Caldwell, New Jersey. Typical liquid diluents are described in Marsden, *Solvents Guide*, 2nd Ed., Interscience, New York, 1950. *McCutcheon's Detergents and Emulsifiers Annual*, Allured Publ. Corp., Ridgewood, New Jersey, as well as Sisely and Wood, *Encyclopedia of Surface Active Agents*, Chemical Publ. Co., Inc., New York, 1964, list surfactants and recommended uses. All formulations can contain minor amounts of additives to reduce foam, caking, corrosion, microbiological growth and the like, or thickeners to increase viscosity.

Surfactants include, for example, polyethoxylated alcohols, polyethoxylated alkylphenols, polyethoxylated sorbitan fatty acid esters, dialkyl sulfosuccinates, alkyl sulfates, alkylbenzene sulfonates, organosilicones, *N,N*-dialkyltaurates, lignin sulfonates, naphthalene sulfonate formaldehyde condensates, polycarboxylates, and polyoxyethylene/polyoxypropylene block copolymers. Solid diluents include, for example, clays such as bentonite, montmorillonite, attapulgite and kaolin, starch, sugar, silica, talc, diatomaceous earth, urea, calcium carbonate, sodium carbonate and bicarbonate, and sodium sulfate. Liquid diluents include, for example, water, *N,N*-dimethylformamide, dimethyl sulfoxide, *N*-alkylpyrrolidone, ethylene glycol, polypropylene glycol, paraffins, alkylbenzenes, alkylnaphthalenes, oils of olive, castor, linseed, tung, sesame, corn, peanut, cotton-seed, soybean, rape-seed and coconut, fatty acid esters, ketones such as cyclohexanone, 2-heptanone, isophorone and 4-hydroxy-4-methyl-2-pentanone, and alcohols such as methanol, cyclohexanol, decanol and tetrahydrofurfuryl alcohol.

Solutions, including emulsifiable concentrates, can be prepared by simply mixing the ingredients. Dusts and powders can be prepared by blending and, usually, grinding as in a hammer mill or fluid-energy mill. Suspensions are usually prepared by wet-milling; see, for example, U.S. 3,060,084. Granules and pellets can be prepared by spraying the active material upon preformed granular carriers or by agglomeration techniques. See Browning, "Agglomeration", *Chemical Engineering*, December 4, 1967, pp 147–48, *Perry's Chemical*

Engineer's Handbook, 4th Ed., McGraw-Hill, New York, 1963, pages 8–57 and following, and PCT Publication WO 91/13546. Pellets can be prepared as described in U.S. 4,172,714. Water-dispersible and water-soluble granules can be prepared as taught in U.S. 4,144,050, U.S. 3,920,442 and DE 3,246,493. Tablets can be prepared as taught in U.S. 5,180,587, U.S. 5,232,701 and U.S. 5,208,030. Films can be prepared as taught in GB 2,095,558 and U.S. 3,299,566.

For further information regarding the art of formulation, see T. S. Woods, "The Formulator's Toolbox – Product Forms for Modern Agriculture" in *Pesticide Chemistry and Bioscience, The Food–Environment Challenge*, T. Brooks and T. R. Roberts, Eds., Proceedings of the 9th International Congress on Pesticide Chemistry, The Royal Society of Chemistry, Cambridge, 1999, pp. 120–133. See also U.S. 3,235,361, Col. 6, line 16 through Col. 7, line 19 and Examples 10–41; U.S. 3,309,192, Col. 5, line 43 through Col. 7, line 62 and Examples 8, 12, 15, 39, 41, 52, 53, 58, 132, 138–140, 162–164, 166, 167 and 169–182; U.S. 2,891,855, Col. 3, line 66 through Col. 5, line 17 and Examples 1–4; Klingman, *Weed Control as a Science*, John Wiley and Sons, Inc., New York, 1961, pp 81–96; and Hance et al., *Weed Control Handbook*, 8th Ed., Blackwell Scientific Publications, Oxford, 1989.

In the following Examples, all percentages are by weight and all formulations are prepared in conventional ways. Compound numbers refer to compounds in Index Tables A-D.

Example A

Wettable Powder

Compound 7	65.0%
dodecylphenol polyethylene glycol ether	2.0%
sodium ligninsulfonate	4.0%
sodium silicoaluminate	6.0%
montmorillonite (calcined)	23.0%.

Example B

Granule

Compound 7	10.0%
attapulgite granules (low volatile matter, 0.71/0.30 mm; U.S.S. No. 25–50 sieves)	90.0%.

Example C

Extruded Pellet

Compound 7	25.0%
anhydrous sodium sulfate	10.0%
crude calcium ligninsulfonate	5.0%
sodium alkylnaphthalenesulfonate	1.0%
calcium/magnesium bentonite	59.0%.

Example D

Emulsifiable Concentrate

Compound 7	20.0%
blend of oil soluble sulfonates and polyoxyethylene ethers	10.0%
isophorone	70.0%.

Example E

Granule

Compound 7	0.5%
cellulose	2.5%
lactose	4.0%
cornmeal	93.0%.

Compounds of this invention are characterized by favorable metabolic and/or soil residual patterns and exhibit activity controlling a spectrum of agronomic and non-agronomic invertebrate pests. (In the context of this disclosure "invertebrate pest control" means inhibition of invertebrate pest development (including mortality) that causes significant reduction in feeding or other injury or damage caused by the pest; related expressions are defined analogously.) As referred to in this disclosure, the term "invertebrate pest" includes arthropods, gastropods and nematodes of economic importance as pests. The term "arthropod" includes insects, mites, spiders, scorpions, centipedes, millipedes, pill bugs and symphylans. The term "gastropod" includes snails, slugs and other Stylommatophora. The term "nematode" includes all of the helminths, such as: roundworms, heartworms, and phytophagous nematodes (Nematoda), flukes (Tematoda), Acanthocephala, and tapeworms (Cestoda). Those skilled in the art will recognize that not all compounds are equally effective against all pests. Compounds of this invention display activity against economically important agronomic, forest, greenhouse, nursery, ornamentals, food and fiber, public and animal health, domestic and commercial structure, household, and stored product pests. These include larvae of the order Lepidoptera, such as armyworms, cutworms, loopers, and heliothines in the family Noctuidae (e.g., fall armyworm (*Spodoptera fugiperda* J. E. Smith), beet armyworm (*Spodoptera exigua*

Hübner), black cutworm (*Agrotis ipsilon* Hufnagel), cabbage looper (*Trichoplusia ni* Hübner), tobacco budworm (*Heliothis virescens* Fabricius)); borers, casebearers, webworms, coneworms, cabbageworms and skeletonizers from the family Pyralidae (e.g., European corn borer (*Ostrinia nubilalis* Hübner), navel orangeworm (*Amyelois transitella* Walker), corn root webworm (*Crambus caliginosellus* Clemens), sod webworm (*Herpetogramma licarsisalis* Walker)); leafrollers, budworms, seed worms, and fruit worms in the family Tortricidae (e.g., codling moth (*Cydia pomonella* Linnaeus), grape berry moth (*Endopiza viteana* Clemens), oriental fruit moth (*Grapholita molesta* Busck)); and many other economically important lepidoptera (e.g., diamondback moth (*Plutella xylostella* Linnaeus), pink bollworm (*Pectinophora gossypiella* Saunders), gypsy moth (*Lymantria dispar* Linnaeus)); nymphs and adults of the order Blattodea including cockroaches from the families Blattellidae and Blattidae (e.g., oriental cockroach (*Blatta orientalis* Linnaeus), Asian cockroach (*Blatella asahinai* Mizukubo), German cockroach (*Blattella germanica* Linnaeus), brownbanded cockroach (*Supella longipalpa* Fabricius), American cockroach (*Periplaneta americana* Linnaeus), brown cockroach (*Periplaneta brunnea* Burmeister), Madeira cockroach (*Leucophaea maderae* Fabricius)); foliar feeding larvae and adults of the order Coleoptera including weevils from the families Anthribidae, Bruchidae, and Curculionidae (e.g., boll weevil (*Anthonomus grandis* Boheman), rice water weevil (*Lissorhoptrus oryzophilus* Kuschel), granary weevil (*Sitophilus granarius* Linnaeus), rice weevil (*Sitophilus oryzae* Linnaeus)); flea beetles, cucumber beetles, rootworms, leaf beetles, potato beetles, and leafminers in the family Chrysomelidae (e.g., Colorado potato beetle (*Leptinotarsa decemlineata* Say), western corn rootworm (*Diabrotica virgifera virgifera* LeConte)); chafers and other beetles from the family Scaribaeidae (e.g., Japanese beetle (*Popillia japonica* Newman) and European chafer (*Rhizotrogus majalis* Razoumowsky)); carpet beetles from the family Dermestidae; wireworms from the family Elateridae; bark beetles from the family Scolytidae and flour beetles from the family Tenebrionidae. In addition it includes: adults and larvae of the order Dermaptera including earwigs from the family Forficulidae (e.g., European earwig (*Forficula auricularia* Linnaeus), black earwig (*Chelisoches morio* Fabricius)); adults and nymphs of the orders Hemiptera and Homoptera such as, plant bugs from the family Miridae, cicadas from the family Cicadidae, leafhoppers (e.g. *Empoasca* spp.) from the family Cicadellidae, planthoppers from the families Fulgoroidae and Delphacidae, treehoppers from the family Membracidae, psyllids from the family Psyllidae, whiteflies from the family Aleyrodidae, aphids from the family Aphididae, phylloxera from the family Phylloxeridae, mealybugs from the family Pseudococcidae, scales from the families Coccidae, Diaspididae and Margarodidae, lace bugs from the family Tingidae, stink bugs from the family Pentatomidae, cinch bugs (e.g., *Blissus* spp.) and other seed bugs from the family Lygaeidae, spittlebugs from the family Cercopidae squash bugs from the family Coreidae, and red bugs and cotton

stainers from the family Pyrrhocoridae. Also included are adults and larvae of the order Acari (mites) such as spider mites and red mites in the family Tetranychidae (e.g., European red mite (*Panonychus ulmi* Koch), two spotted spider mite (*Tetranychus urticae* Koch), McDaniel mite (*Tetranychus mcdanieli* McGregor)), flat mites in the family Tenuipalpidae (e.g., citrus flat mite (*Brevipalpus lewisi* McGregor)), rust and bud mites in the family Eriophyidae and other foliar feeding mites and mites important in human and animal health, i.e. dust mites in the family Epidermoptidae, follicle mites in the family Demodicidae, grain mites in the family Glycyphagidae, ticks in the order Ixodidae (e.g., deer tick (*Ixodes scapularis* Say), Australian paralysis tick (*Ixodes holocyclus* Neumann), American dog tick (*Dermacentor variabilis* Say), lone star tick (*Amblyomma americanum* Linnaeus) and scab and itch mites in the families Psoroptidae, Pyemotidae, and Sarcoptidae; adults and immatures of the order Orthoptera including grasshoppers, locusts and crickets (e.g., migratory grasshoppers (e.g., *Melanoplus sanguinipes* Fabricius, *M. differentialis* Thomas), American grasshoppers (e.g., *Schistocerca americana* Drury), desert locust (*Schistocerca gregaria* Forskal), migratory locust (*Locusta migratoria* Linnaeus), house cricket (*Acheta domesticus* Linnaeus), mole crickets (*Gryllotalpa* spp.)); adults and immatures of the order Diptera including leafminers, midges, fruit flies (Tephritidae), frit flies (e.g., *Oscinella frit* Linnaeus), soil maggots, house flies (e.g., *Musca domestica* Linnaeus), lesser house flies (e.g., *Fannia canicularis* Linnaeus, *F. femoralis* Stein), stable flies (e.g., *Stomoxys calcitrans* Linnaeus), face flies, horn flies, blow flies (e.g., *Chrysomya* spp., *Phormia* spp.), and other muscoid fly pests, horse flies (e.g., *Tabanus* spp.), bot flies (e.g., *Gastrophilus* spp., *Oestrus* spp.), cattle grubs (e.g., *Hypoderma* spp.), deer flies (e.g., *Chrysops* spp.), keds (e.g., *Melophagus ovinus* Linnaeus) and other Brachycera, mosquitoes (e.g., *Aedes* spp., *Anopheles* spp., *Culex* spp.), black flies (e.g., *Prosimulium* spp., *Simulium* spp.), biting midges, sand flies, sciarids, and other Nematocera; adults and immatures of the order Thysanoptera including onion thrips (*Thrips tabaci* Lindeman) and other foliar feeding thrips; insect pests of the order Hymenoptera including ants (e.g., red carpenter ant (*Camponotus ferrugineus* Fabricius), black carpenter ant (*Camponotus pennsylvanicus* De Geer), Pharaoh ant (*Monomorium pharaonis* Linnaeus), little fire ant (*Wasmannia auropunctata* Roger), fire ant (*Solenopsis geminata* Fabricius), red imported fire ant (*Solenopsis invicta* Buren), Argentine ant (*Iridomyrmex humilis* Mayr), crazy ant (*Paratrechina longicornis* Latreille), pavement ant (*Tetramorium caespitum* Linnaeus), cornfield ant (*Lasius alienus* Förster), odorous house ant (*Tapinoma sessile* Say)), bees (including carpenter bees), hornets, yellow jackets and wasps; insect pests of the order Isoptera including the eastern subterranean termite (*Reticulitermes flavipes* Kollar), western subterranean termite (*Reticulitermes hesperus* Banks), Formosan subterranean termite (*Coptotermes formosanus* Shiraki), West Indian drywood termite (*Incisitermes immigrans* Snyder) and other termites of economic importance; insect pests of the order Thysanura such

as silverfish (*Lepisma saccharina* Linnaeus) and firebrat (*Thermobia domestica* Packard); insect pests of the order Mallophaga and including the head louse (*Pediculus humanus capitis* De Geer), body louse (*Pediculus humanus humanus* Linnaeus), chicken body louse (*Menacanthus stramineus* Nitszch), dog biting louse (*Trichodectes canis* De Geer), fluff louse (*Goniocotes gallinae* De Geer), sheep body louse (*Bovicola ovis* Schrank), short-nosed cattle louse (*Haematopinus eurysternus* Nitzsch), long-nosed cattle louse (*Linognathus vituli* Linnaeus) and other sucking and chewing parasitic lice that attack man and animals; insect pests of the order Siphonoptera including the oriental rat flea (*Xenopsylla cheopis* Rothschild), cat flea (*Ctenocephalides felis* Bouche), dog flea (*Ctenocephalides canis* Curtis), hen flea (*Ceratophyllus gallinae* Schrank), sticktight flea (*Echidnophaga gallinacea* Westwood), human flea (*Pulex irritans* Linnaeus) and other fleas afflicting mammals and birds. Additional arthropod pests covered include: spiders in the order Araneae such as the brown recluse spider (*Loxosceles reclusa* Gertsch & Mulaik) and the black widow spider (*Latrodectus mactans* Fabricius), and centipedes in the order Scutigeromorpha such as the house centipede (*Scutigera coleoptrata* Linnaeus). Activity also includes members of the Classes Nematoda, Cestoda, Trematoda, and Acanthocephala including economically important members of the orders Strongylida, Ascaridida, Oxyurida, Rhabditida, Spirurida, and Enoplida such as but not limited to economically important agricultural pests (i.e. root knot nematodes in the genus *Meloidogyne*, lesion nematodes in the genus *Pratylenchus*, stubby root nematodes in the genus *Trichodorus*, etc.) and animal and human health pests (i.e. all economically important flukes, tapeworms, and roundworms, such as *Strongylus vulgaris* in horses, *Toxocara canis* in dogs, *Haemonchus contortus* in sheep, *Dirofilaria immitis* Leidy in dogs, *Anoplocephala perfoliata* in horses, *Fasciola hepatica* Linnaeus in ruminants, etc.).

Compounds of the invention show particularly high activity against pests in the order Lepidoptera (e.g., *Alabama argillacea* Hübner (cotton leaf worm), *Archips argyrospila* Walker (fruit tree leaf roller), *A. rosana* Linnaeus (European leaf roller) and other *Archips* species, *Chilo suppressalis* Walker (rice stem borer), *Cnaphalocrosis medinalis* Guenee (rice leaf roller), *Crambus caliginosellus* Clemens (corn root webworm), *Crambus teterrellus* Zincken (bluegrass webworm), *Cydia pomonella* Linnaeus (codling moth), *Earias insulana* Boisduval (spiny bollworm), *Earias vittella* Fabricius (spotted bollworm), *Helicoverpa armigera* Hübner (American bollworm), *Helicoverpa zea* Boddie (corn earworm), *Heliothis virescens* Fabricius (tobacco budworm), *Herpetogramma licarsisalis* Walker (sod webworm), *Lobesia botrana* Denis & Schiffermüller (grape berry moth), *Pectinophora gossypiella* Saunders (pink bollworm), *Phyllocnistis citrella* Stainton (citrus leafminer), *Pieris brassicae* Linnaeus (large white butterfly), *Pieris rapae* Linnaeus (small white butterfly), *Plutella xylostella* Linnaeus (diamondback moth), *Spodoptera exigua* Hübner (beet armyworm), *Spodoptera litura* Fabricius (tobacco cutworm, cluster caterpillar),

Spodoptera frugiperda J. E. Smith (fall armyworm), *Trichoplusia ni* Hübner (cabbage looper) and *Tuta absoluta* Meyrick (tomato leafminer)). Compounds of the invention also have commercially significant activity on members from the order Homoptera including: *Acyrthisiphon pisum* Harris (pea aphid), *Aphis craccivora* Koch (cowpea aphid), *Aphis fabae* Scopoli (black bean aphid), *Aphis gossypii* Glover (cotton aphid, melon aphid), *Aphis pomi* De Geer (apple aphid), *Aphis spiraecola* Patch (spirea aphid), *Aulacorthum solani* Kaltenbach (foxglove aphid), *Chaetosiphon fragaefolii* Cockerell (strawberry aphid), *Diuraphis noxia* Kurdjumov/Mordvilko (Russian wheat aphid), *Dysaphis plantaginea* Paaserini (rosy apple aphid), *Eriosoma lanigerum* Hausmann (woolly apple aphid), *Hyalopterus pruni* Geoffroy (mealy plum aphid), *Lipaphis erysimi* Kaltenbach (turnip aphid), *Metopolophium dirrhodum* Walker (cereal aphid), *Macrosipum euphorbiae* Thomas (potato aphid), *Myzus persicae* Sulzer (peach-potato aphid, green peach aphid), *Nasonovia ribisnigri* Mosley (lettuce aphid), *Pemphigus* spp. (root aphids and gall aphids), *Rhopalosiphum maidis* Fitch (corn leaf aphid), *Rhopalosiphum padi* Linnaeus (bird cherry-oat aphid), *Schizaphis graminum* Rondani (greenbug), *Sitobion avenae* Fabricius (English grain aphid), *Therioaphis maculata* Buckton (spotted alfalfa aphid), *Toxoptera aurantii* Boyer de Fonscolombe (black citrus aphid), and *Toxoptera citricida* Kirkaldy (brown citrus aphid); *Adelges* spp. (adelgids); *Phylloxera devastatrix* Pergande (pecan phylloxera); *Bemisia tabaci* Gennadius (tobacco whitefly, sweetpotato whitefly), *Bemisia argentifolii* Bellows & Perring (silverleaf whitefly), *Dialeurodes citri* Ashmead (citrus whitefly) and *Trialeurodes vaporariorum* Westwood (greenhouse whitefly); *Empoasca fabae* Harris (potato leafhopper), *Laodelphax striatellus* Fallen (smaller brown planthopper), *Macrolestes quadrilineatus* Forbes (aster leafhopper), *Nephotettix cincticeps* Uhler (green leafhopper), *Nephotettix nigropictus* Stål (rice leafhopper), *Nilaparvata lugens* Stål (brown planthopper), *Peregrinus maidis* Ashmead (corn planthopper), *Sogatella furcifera* Horvath (white-backed planthopper), *Sogatodes orizicola* Muir (rice delphacid), *Typhlocyba pomaria* McAtee white apple leafhopper, *Erythroneoura* spp. (grape leafhoppers); *Magicidada septendecim* Linnaeus (periodical cicada); *Icerya purchasi* Maskell (cottony cushion scale), *Quadraspidiotus perniciosus* Comstock (San Jose scale); *Planococcus citri* Risso (citrus mealybug); *Pseudococcus* spp. (other mealybug complex); *Cacopsylla pyricola* Foerster (pear psylla), *Trioza diospyri* Ashmead (persimmon psylla). These compounds also have activity on members from the order Hemiptera including: *Acrosternum hilare* Say (green stink bug), *Anasa tristis* De Geer (squash bug), *Blissus leucopterus leucopterus* Say (chinch bug), *Corythuca gossypii* Fabricius (cotton lace bug), *Cyrtopeltis modesta* Distant (tomato bug), *Dysdercus suturellus* Herrich-Schäffer (cotton stainer), *Euchistus servus* Say (brown stink bug), *Euchistus variolarius* Palisot de Beauvois (one-spotted stink bug), *Graptosthetus* spp. (complex of seed bugs), *Leptoglossus corculus* Say (leaf-footed pine seed bug), *Lygus lineolaris* Palisot de Beauvois (tarnished plant bug), *Nezara viridula* Linnaeus (southern

green stink bug), *Oebalus pugnax* Fabricius (rice stink bug), *Oncopeltus fasciatus* Dallas (large milkweed bug), *Pseudatomoscelis seriatus* Reuter (cotton fleahopper). Other insect orders controlled by compounds of the invention include Thysanoptera (e.g., *Frankliniella occidentalis* Pergande (western flower thrip), *Scirthothrips citri* Moulton (citrus thrip), *Sericothrips variabilis* Beach (soybean thrip), and *Thrips tabaci* Lindeman (onion thrip); and the order Coleoptera (e.g., *Leptinotarsa decemlineata* Say (Colorado potato beetle), *Epilachna varivestis* Mulsant (Mexican bean beetle) and wireworms of the genera *Agriotes*, *Athous* or *Limonius*).

Compounds of Formula I can also be mixed with one or more other biologically active compounds or agents including insecticides, fungicides, nematocides, bactericides, acaricides, growth regulators such as rooting stimulants, chemosterilants, semiochemicals, repellents, attractants, pheromones, feeding stimulants, other biologically active compounds or entomopathogenic bacteria, virus or fungi to form a multi-component pesticide giving an even broader spectrum of agricultural utility. Thus the present invention also relates to a method wherein the invertebrate pest or its environment is contacted with a biologically effective amount of a compound of Formula I or a composition comprising a compound of Formula I and a biologically effective amount of at least one additional compound or agent for controlling invertebrate pests. Likewise compositions of the present invention comprising a compound of Formula Ia can further comprise a biologically effective amount of at least one additional biologically active compound or agent. Examples of such biologically active compounds or agents with which compounds of this invention can be formulated are: insecticides such as abamectin, acephate, acetamiprid, avermectin, azadirachtin, azinphos-methyl, bifenthrin, binfenazate, buprofezin, carbofuran, chlorfenapyr, chlorfluazuron, chlorpyrifos, chlorpyrifos-methyl, chromafenozide, clothianidin, cyfluthrin, beta-cyfluthrin, cyhalothrin, lambda-cyhalothrin, cypermethrin, cyromazine, deltamethrin, diafenthiuron, diazinon, diflubenzuron, dimethoate, diofenolan, emamectin, endosulfan, esfenvalerate, ethiprole, fenothicarb, fenoxycarb, fenpropathrin, fenproximate, fenvalerate, fipronil, flonicamid, flucythrinate, tau-fluvalinate, flufenoxuron, fonophos, halofenozide, hexaflumuron, imidacloprid, indoxacarb, isofenphos, lufenuron, malathion, metaldehyde, methamidophos, methidathion, methomyl, methoprene, methoxychlor, monocrotophos, methoxyfenozide, nithiazin, novaluron, oxamyl, parathion, parathion-methyl, permethrin, phorate, phosalone, phosmet, phosphamidon, pirimicarb, profenofos, pymetrozine, pyridalyl, pyriproxyfen, rotenone, spinosad, sulprofos, tebufenozide, teflubenzuron, tefluthrin, terbufos, tetrachlorvinphos, thiacloprid, thiamethoxam, thiodicarb, thiosultap-sodium, tralomethrin, trichlorfon and triflumuron; fungicides such as acibenzolar, azoxystrobin, benomyl, blasticidin-S, Bordeaux mixture (tribasic copper sulfate), bromuconazole, carpropamid, captafol, captan, carbendazim, chloroneb, chlorothalonil, copper oxychloride, copper salts, cyflufenamid, cymoxanil, cyproconazole, cyprodinil, (*S*)-3,5-dichloro-*N*-(3-

chloro-1-ethyl-1-methyl-2-oxopropyl)-4-methylbenzamide (RH 7281), diclocymet (S-2900), diclomezine, dicloran, difenoconazole, (*S*)-3,5-dihydro-5-methyl-2-(methylthio)-5-phenyl-3-(phenylamino)-4*H*-imidazol-4-one (RP 407213), dimethomorph, dimoxystrobin, diniconazole, diniconazole-M, dodine, edifenphos, epoxiconazole, famoxadone, fenamidone, fenarimol, fenbuconazole, fencaramid (SZX0722), fenpiclonil, fenpropidin, fenpropimorph, fentin acetate, fentin hydroxide, fluazinam, fludioxonil, flumetover (RPA 403397), fluquinconazole, flusilazole, flutolanil, flutriafol, folpet, fosetyl-aluminum, furalaxyl, furametapyr (S-82658), hexaconazole, ipconazole, iprobenfos, iprodione, isoprothiolane, kasugamycin, kresoxim-methyl, mancozeb, maneb, mefenoxam, mepronil, metalaxyl, metconazole, metominostrobin/fenominostrobin (SSF-126), myclobutanil, neo-asozin (ferric methanearsonate), oxadixyl, penconazole, pencycuron, probenazole, prochloraz, propamocarb, propiconazole, pyrifenox, pyraclostrobin, pyrimethanil, pyroquilon, quinoxyfen, spiroxamine, sulfur, tebuconazole, tetraconazole, thiabendazole, thifluzamide, thiophanate-methyl, thiram, tiadinil, triadimefon, triadimenol, tricyclazole, trifloxystrobin, triticonazole, validamycin and vinclozolin; nematocides such as aldicarb, oxamyl and fenamiphos; bactericides such as streptomycin; acaricides such as amitraz, chinomethionat, chlorobenzilate, cyhexatin, dicofol, dienochlor, etoxazole, fenazaquin, fenbutatin oxide, fenpropathrin, fenpyroximate, hexythiazox, propargite, pyridaben and tebufenpyrad; and biological agents such as *Bacillus thuringiensis* including ssp. *aizawai* and *kurstaki*, *Bacillus thuringiensis* delta endotoxin, baculovirus, and entomopathogenic bacteria, virus and fungi.

A general reference for these agricultural protectants is *The Pesticide Manual, 12th Edition*, C. D. S. Tomlin, Ed., British Crop Protection Council, Farnham, Surrey, U.K., 2000.

Preferred insecticides and acaricides for mixing with compounds of Formula I or Ia include pyrethroids such as cypermethrin, cyhalothrin, cyfluthrin, beta-cyfluthrin, esfenvalerate, fenvalerate and tralomethrin; carbamates such as fenothicarb, methomyl, oxamyl and thiodicarb; neonicotinoids such as clothianidin, imidacloprid and thiacloprid; neuronal sodium channel blockers such as indoxacarb; insecticidal macrocyclic lactones such as spinosad, abamectin, avermectin and emamectin; γ–aminobutyric acid (GABA) antagonists such as endosulfan, ethiprole and fipronil; insecticidal ureas such as flufenoxuron and triflumuron; juvenile hormone mimics such as diofenolan and pyriproxyfen; pymetrozine; and amitraz. Preferred biological agents for mixing with compounds of Formula I or Ia include *Bacillus thuringiensis* and *Bacillus thuringiensis* delta endotoxin as well as naturally occurring and genetically modified viral insecticides including members of the family Baculoviridae as well as entomophagous fungi.

Most preferred mixtures include a mixture of a compound of Formula I or Ia with cyhalothrin; a mixture of a compound of Formula I or Ia with beta-cyfluthrin; a mixture of a compound of Formula I or Ia with esfenvalerate; a mixture of a compound of Formula I or Ia

with methomyl; a mixture of a compound of Formula I or Ia with imidacloprid; a mixture of a compound of Formula I or Ia with thiacloprid; a mixture of a compound of Formula I or Ia with indoxacarb; a mixture of a compound of Formula I or Ia with abamectin; a mixture of a compound of Formula I or Ia with endosulfan; a mixture of a compound of Formula I or Ia with ethiprole; a mixture of a compound of Formula I or Ia with fipronil; a mixture of a compound of Formula I or Ia with flufenoxuron; a mixture of a compound of Formula I or Ia with pyriproxyfen; a mixture of a compound of Formula I or Ia with pymetrozine; a mixture of a compound of Formula I or Ia with amitraz; a mixture of a compound of Formula I or Ia with *Bacillus thuringiensis* and a mixture of a compound of Formula I or Ia with *Bacillus thuringiensis* delta endotoxin.

In certain instances, combinations with other invertebrate pest control compounds or agents having a similar spectrum of control but a different mode of action will be particularly advantageous for resistance management. Thus, compositions of the present invention comprising a compound of Formula Ia can further comprise a biologically effective amount of at least one additional invertebrate pest control compound or agent having a similar spectrum of control but a different mode of action, and the methods of the present invention can utilize compositions compromising a compound of Formula I and a biologically effective amount of at least one additional invertebrate pest control compound or agent having a similar spectrum of control but a different mode of action. Contacting a plant genetically modified to express a plant protection compound (e.g., protein) or the locus of the plant with a biologically effective amount of a compound of Formula I or Ia can also provide a broader spectrum of plant protection and be advantageous for resistance management.

Invertebrate pests are controlled and protection of agronomic, horticultural and specialty crops, animal and human health is achieved by applying one or more of the compounds of Formula I or Ia, in an effective amount, to the environment of the pests including the agronomic and/or nonagronomic locus of infestation, to the area to be protected, or directly on the pests to be controlled. Thus, the present invention comprises a method for the control of foliar- and soil-inhabiting invertebrates and protection of agronomic and/or nonagronomic crops, comprising contacting the invertebrates or their environment with a biologically effective amount of one or more of the compounds of Formula I, or with a composition comprising at least one such compound or a composition comprising at least one such compound and an effective amount of at least one additional biologically active compound or agent. A preferred method of contact is by spraying. Alternatively, a granular composition comprising a compound of Formula I or Ia can be applied to the plant foliage or the soil. Compounds of Formula I or Ia are effective in delivery through plant uptake by contacting the plant with a composition comprising a compound of Formula I or Ia applied as a soil drench of a liquid formulation, a granular

formulation to the soil, a nursery box treatment or a dip of transplants. Other methods of contact include application of a compound of Formula I or Ia or a composition comprising of Formula I or Ia of the invention by direct and residual sprays, aerial sprays, seed coats, microencapsulations, systemic uptake, baits, eartags, boluses, foggers, fumigants, aerosols, dusts and many others.

The compounds of Formula I or Ia can be incorporated into baits that are consumed by the invertebrates or within devices such as traps and the like. Granules or baits comprising between 0.01–5% active ingredient, 0.05–10% moisture retaining agent(s) and 40–99% vegetable flour are effective in controlling soil insects at very low application rates, particularly at doses of active ingredient that are lethal by ingestion rather than by direct contact.

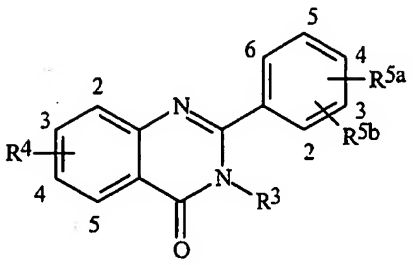
The compounds of Formula I or Ia can be applied in their pure state, but most often application will be of a formulation comprising one or more compounds with suitable carriers, diluents, and surfactants and possibly in combination with a food depending on the contemplated end use. A preferred method of application involves spraying a water dispersion or refined oil solution of the compounds. Combinations with spray oils, spray oil concentrations, spreader stickers, adjuvants, other solvents, and synergists such as piperonyl butoxide often enhance compound efficacy.

The rate of application required for effective control (i.e. "biologically effective amount") will depend on such factors as the species of invertebrate to be controlled, the pest's life cycle, life stage, its size, location, time of year, host crop or animal, feeding behavior, mating behavior, ambient moisture, temperature, and the like. Under normal circumstances, application rates of about 0.01 to 2 kg of active ingredient per hectare are sufficient to control pests in agronomic ecosystems, but as little as 0.0001 kg/hectare may be sufficient or as much as 8 kg/hectare may be required. For nonagronomic applications, effective use rates will range from about 1.0 to 50 mg/square meter but as little as 0.1 mg/square meter may be sufficient or as much as 150 mg/square meter may be required. One skilled in the art can easily determine the biologically effective amount necessary for the desired level of invertebrate pest control.

The following Tests in the Biological Examples of the Invention demonstrate the efficacy of methods of the invention for protecting plants from specific arthropod pests. "Control efficacy" represents inhibition of arthropod development (including mortality) that causes significantly reduced feeding. The pest control protection afforded by the compounds is not limited, however, to these species. See Index Tables A-D for compound descriptions. The following abbreviations are used in the Index Tables which follows: *t* is tertiary, *n* is normal, *i* is iso, *s* is secondary, *c* is cyclo, Me is methyl, Et is ethyl, Pr is propyl and Bu is butyl; accordingly *i*-Pr is isopropyl, *s*-Bu is secondary butyl, etc. The abbreviation

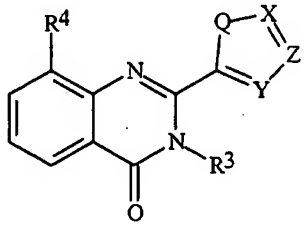
"Ex." stands for "Example" and is followed by a number indicating in which example the compound is prepared.

Index Table A



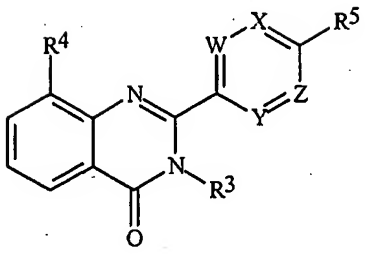
Compound	R^3	R^4	R^{5a}	R^{5b}	mp °C
1	*i*-Pr	2-Me	H	4-OCF_3	oil
2	*i*-Pr	2-Me	H	4-CF_3	oil
3 (Ex. 1)	*i*-Pr	2-Me	2-Me	4-CF_3	100-103

Index Table B



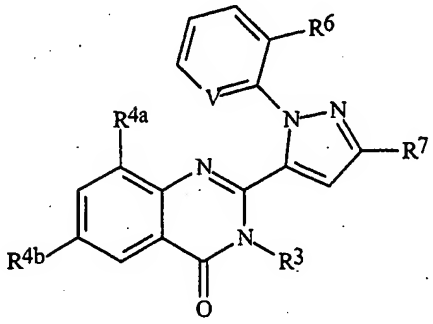
Compound	R^3	R^4	Q	X	Y	Z	mp °C
4	*i*-Pr	Cl	NPh	N	CH	CCF_3	155-159

Index Table C



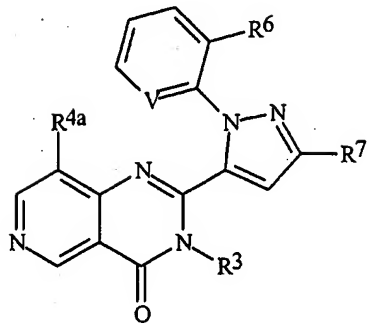
Compound	R^3	R^4	W	X	Y	Z	R^5	m.p. °C
5	*i*-Pr	Me	C-Me	N	CH	CH	CF_3	132-135
6	*i*-Pr	Me	C-Et	N	CH	CH	Cl	127-131

Index Table D



Compound	R^3	R^{4a}	R^{4b}	R^6	R^7	V	mp °C
7 (Ex. 3)	Me	Cl	H	Cl	CF_3	N	155-159
8	*i*-Pr	Me	H	H	CF_3	CH	
9	$CH_2CHClCH_3$	Me	H	Cl	CF_3	CH	178-180
10 (Ex. 2)	Me	Me	Cl	Cl	CF_3	N	solid
11	*i*-Pr	Me	Cl	Cl	Br	N	190-193

Index Table E



Compound	R^3	R^{4a}	R^6	R^7	V	mp °C
12	$CH_2C{\equiv}CH$	Me	Cl	Br	CH	
13	$CH_2C{\equiv}CH$	Me	Cl	CF_3	CH	

BIOLOGICAL EXAMPLES OF THE INVENTION

TEST

For evaluating control of diamondback moth (*Plutella xylostella*) the test unit consisted of a small open container with a 12–14-day-old radish plant inside. This was pre-infested with 10–15 neonate larvae on a piece of insect diet by use of a core sampler to remove a plug from a sheet of hardened insect diet having many larvae growing on it and transfer the plug containing larvae and diet to the test unit. The larvae moved onto the test plant as the diet plug dried out.

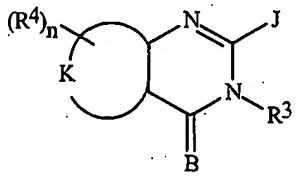
Test compounds were formulated using a solution containing 10% acetone, 90% water and 300 ppm X-77® Spreader Lo-Foam Formula non-ionic surfactant containing alkylarylpolyoxyethylene, free fatty acids, glycols and isopropanol (Loveland Industries, Inc.), unless otherwise indicated. The formulated compounds were applied in 1 mL of liquid through a SUJ2 atomizer nozzle with 1/8 JJ custom body (Spraying Systems Co.) positioned 1.27 cm (0.5 inches) above the top of each test unit. All experimental compounds in this screen were sprayed at 250 ppm and replicated three times. After spraying of the formulated test compound, each test unit was allowed to dry for 1 hour and then a black, screened cap was placed on top. The test units were held for 6 days in a growth chamber at 25 °C and 70% relative humidity. Plant feeding damage was then visually assessed.

Of the compounds tested, the following provided very good levels of plant protection (20% or less feeding damage): 3, 4, 5, 6, 8 and 10.

CLAIMS

What is claimed is:

1. A method for controlling an invertebrate pest comprising contacting the invertebrate pest or its environment with a biologically effective amount of a compound of Formula I, its *N*-oxide or an agriculturally suitable salt of the compound



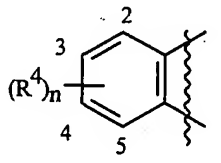
I

wherein

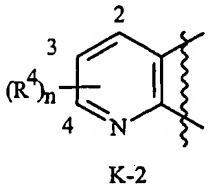
B is O or S;

J is a phenyl ring substituted with 1 to 4 R^5, or a naphthyl ring system, a 5- or 6-membered heteroaromatic ring or an aromatic 8-, 9- or 10-membered fused heterobicyclic ring system wherein each ring or ring system is optionally substituted with 1 to 4 R^5;

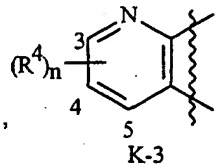
K is, together with the two contiguous linking carbon atoms, a fused phenyl or a fused pyridinyl ring selected from the group consisting of K-1, K-2, K-3, K-4 and K-5, each optionally substituted with 1 to 4 R^4



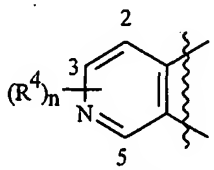
K-1



K-2

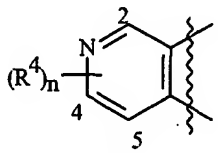


K-3



K-4

or



K-5 ;

R^3 is G; C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, each optionally substituted with one or more substituents selected from the group consisting of halogen, G, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_2-C_6

alkoxycarbonyl, C_2-C_6 alkylcarbonyl, C_3-C_6 trialkylsilyl, or a phenoxy ring optionally substituted with one to three substituents independently selected from R^6; hydroxy; C_1-C_4 alkoxy; C_1-C_4 alkylamino; C_2-C_8 dialkylamino; C_3-C_6 cycloalkylamino; C_2-C_6 alkoxycarbonyl or C_2-C_6 alkylcarbonyl;

G is a phenyl ring or 5- or 6-membered heteroaromatic ring, each ring optionally substituted with one to three substituents independently selected from R^6; a 5- or 6-membered nonaromatic carbocyclic or heterocyclic ring, optionally including one or two ring members selected from the group consisting of C(=O), SO or $S(O)_2$ and optionally substituted with 1 to 4 substituents selected from R^{12};

each R^4 is independently H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_1–C_4 alkoxyalkyl, C_1–C_4 hydroxyalkyl, $C(O)R^{10}$, CO_2R^{10}, $C(O)NR^{10}R^{11}$, $NR^{10}R^{11}$, $N(R^{11})COR^{10}$, $N(R^{11})CO_2R^{10}$ or C_3-C_6 trialkylsilyl; or

each R^4 is independently a phenyl, benzyl, phenoxy or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with one to three substituents independently selected from R^6;

each R^5 is independently H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, CO_2H, $CONH_2$, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_2-C_6 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl, C_3-C_6 trialkylsilyl; or

each R^5 is independently a phenyl, benzyl, benzoyl, phenoxy, 5- or 6-membered heteroaromatic ring or an aromatic 8-, 9- or 10-membered fused heterobicyclic ring system, each ring optionally substituted with one to three substituents independently selected from R^6; or

$(R^5)_2$ when attached to adjacent carbon atoms can be taken together as $-OCF_2O-$, $-CF_2CF_2O-$, or $-OCF_2CF_2O-$;

each R^6 is independently C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8

dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl;

R^{10} is H or C_1–C_4 alkyl or C_1–C_4 haloalkyl;

R^{11} is H or C_1–C_4 alkyl;

each R^{12} is independently C_1-C_2 alkyl, halogen, CN, NO_2 and C_1-C_2 alkoxy; and

n is 1 to 4.

2. The method of Claim 1 wherein B is O and R^3 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl or C_3-C_6 cycloalkyl each optionally substituted with one or more substituents selected from the group consisting of halogen, CN, C_1-C_2 alkoxy, C_1-C_2 alkylthio, C_1-C_2 alkylsulfinyl and C_1-C_2 alkylsulfonyl.

3. The method of Claim 2 wherein J is a phenyl group substituted with 1 to 4 R^5.

4. The method of Claim 3 wherein

n is 1 to 2;

one R^4 group is attached to the K-ring at the 2-position or 5-position, and said R^4 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl or C_1-C_4 haloalkylsulfonyl; and

each R^5 is independently H, halogen, C_1-C_4 alkyl, C_1-C_2 alkoxy, C_1-C_4 haloalkyl, CN, NO_2, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl or C_2-C_4 alkoxycarbonyl; or

each R^5 is independently a phenyl or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with R^6; or

$(R^5)_2$ when attached to adjacent carbon atoms can be taken together as $-OCF_2O-$, $-CF_2CF_2O-$ or $-OCF_2CF_2O-$.

5. The method of Claim 4 wherein

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3 or $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

each R^5 is independently H, halogen, methyl, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, OCH_2CF_3, OCF_2CHF_2, $S(O)_pCH_2CF_3$ or $S(O)_pCF_2CHF_2$; or a phenyl, pyrazole, imidazole, triazole, pyridine or pyrimidine ring, each ring optionally substituted with C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN; and

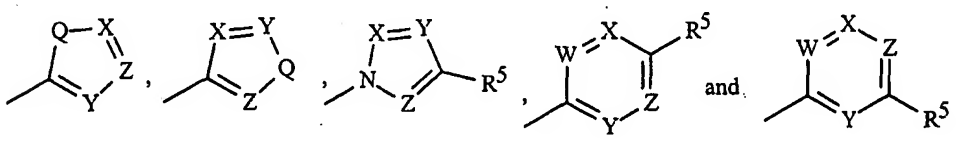
p is 0, 1 or 2.

6. The method of Claim 5 wherein R^3 is *i*-propyl or *t*-butyl.

7. The method of Claim 2 wherein J is a 5- or 6-membered heteroaromatic ring optionally substituted with 1 to 4 R^5.

8. The method of Claim 7 wherein

J is a 5- or 6-membered heteroaromatic ring selected from the group consisting of J-1, J-2, J-3, J-4 and J-5, each J optionally substituted with 1 to 3 R^5



J-1 J-2 J-3 J-4 J-5 ;

Q is O, S or NR^5; and

W, X, Y and Z are independently N or CR^5, provided that in J-4 and J-5 at least one of W, X, Y or Z is N.

9. The method of Claim 8 wherein

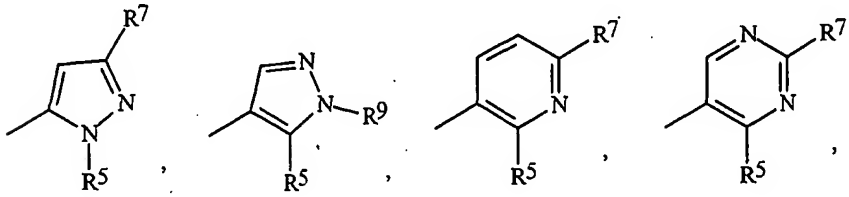
n is 1 to 2;

one R^4 group is attached to the K-ring at the 2-position or 5-position, and said R^4 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, or C_1-C_4 haloalkylsulfonyl; and

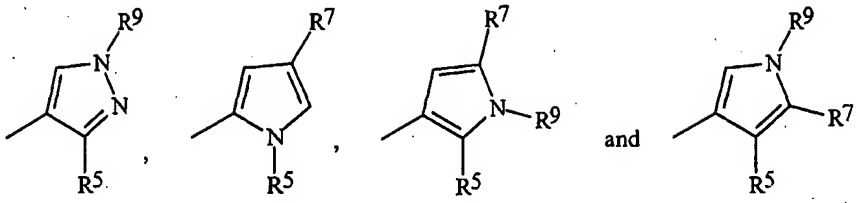
each R^5 is independently H, C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl or C_2-C_4 alkoxycarbonyl; or a phenyl or a 5- or 6-membered heteroaromatic ring, each ring optionally substituted with R^6.

10. The method of Claim 9 wherein

J substituted with 1 to 3 R^5 is selected from the group consisting of J-6, J-7, J-8, J-9, J-10, J-11, J-12 and J-13



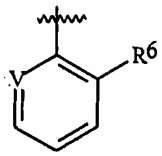
J-6 J-7 J-8 J-9



J-10 J-11 J-12 J-13

;

R^5 is



;

V is N, CH, CF, CCl, CBr or CI;

each R^7 is independently H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, halogen, CN, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy or C_1-C_4 haloalkylthio;

R^9 is H, C_2-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_6 alkenyl, C_3-C_6 haloalkenyl, C_3-C_6 alkynyl or C_3-C_6 haloalkynyl, provided that R^7 and R^9 are not both H; and

n is 0, 1 or 2.

11. The method of Claim 10 wherein

J substituted with 1 to 3 R^5 is J-6;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and

p is 0, 1 or 2.

12. The method of Claim 11 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^7 is halogen or CF_3.

13. The method of Claim 10 wherein

J substituted with 1 to 3 R^5 is J-7;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1 or 2.

14. The method of Claim 13 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

15. The method of Claim 10 wherein
J substituted with 1 to 3 R^5 is J-8;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN R^6 is CH_3, CF_3 or halogen;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

16. The method of Claim 15 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

17. The method of Claim 10 wherein
J substituted with 1 to 3 R^5 is J-9;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

18. The method of Claim 17 wherein
R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is CF_3.

19. The method of Claim 10 wherein
J substituted with 1 to 3 R^5 is J-10;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1or 2.

20. The method of Claim 19 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

21. The method of Claim 10 wherein
J substituted with 1 to 3 R^5 is J-11;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and
p is 0, 1 or 2.

22. The method of Claim 21 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

23. The method of Claim 10 wherein
J substituted with 1 to 3 R^5 is J-12;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1 or 2.

24. The method of Claim 23 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

25. The method of Claim 10 wherein
J substituted with 1 to 3 R^5 is J-13;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1 or 2.

26. The method of Claim 25 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

27. The method of Claim 1 wherein the compound of Formula I is selected from the group consisting of:

8-methyl-3-(1-methylethyl)-2-[2-methyl-6-(trifluoromethyl)-3-pyridinyl]-4(3*H*)-quinazolinone,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3,8-dimethyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-ethyl-8-methyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-methyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-ethyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-(1-methylethyl)-4(3*H*)-quinazoline,

6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline, and
6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline.

28. The method of Claim 1 wherein the compound of Formula I is comprised in a composition, said composition optionally further comprising an effective amount of at least one additional biologically active compound or agent.

29. The method of Claim 28 wherein at least one additional biologically active compound or agent is selected from arthropodicides of the group consisting of pyrethroids, carbamates, neonicotinoids, neuronal sodium channel blockers, insecticidal macrocyclic lactones, γ–aminobutyric acid (GABA) antagonists, insecticidal ureas and juvenile hormone mimics.

30. The method of Claim 28 wherein at least one additional biologically active compound or agent is selected from insecticide, nematocide, acaricide or biological agents in the group consisting of abamectin, acephate, acetamiprid, avermectin, azadirachtin, azinphos-methyl, bifenthrin, binfenazate, buprofezin, carbofuran, chlorfenapyr, chlorfluazuron, chlorpyrifos, chlorpyrifos-methyl, chromafenozide, clothianidin, cyfluthrin, beta-cyfluthrin, cyhalothrin, lambda-cyhalothrin, cypermethrin, cyromazine, deltamethrin, diafenthiuron, diazinon, diflubenzuron, dimethoate, diofenolan, emamectin, endosulfan, esfenvalerate, ethiprole, fenothicarb, fenoxycarb, fenpropathrin, fenproximate, fenvalerate, fipronil, flonicamid, flucythrinate, tau-fluvalinate, flufenoxuron, fonophos, halofenozide, hexaflumuron, imidacloprid, indoxacarb, isofenphos, lufenuron, malathion, metaldehyde, methamidophos, methidathion, methomyl, methoprene, methoxychlor, monocrotophos, methoxyfenozide, nithiazin, novaluron, oxamyl, parathion, parathion-methyl, permethrin, phorate, phosalone, phosmet, phosphamidon, pirimicarb, profenofos, pymetrozine, pyridalyl, pyriproxyfen, rotenone, spinosad, sulprofos, tebufenozide, teflubenzuron, tefluthrin, terbufos, tetrachlorvinphos, thiacloprid, thiamethoxam, thiodicarb, thiosultap-sodium, tralomethrin, trichlorfon and triflumuron, aldicarb, oxamyl, fenamiphos, amitraz, chinomethionat, chlorobenzilate, cyhexatin, dicofol, dienochlor, etoxazole, fenazaquin, fenbutatin oxide, fenpropathrin, fenpyroximate, hexythiazox, propargite, pyridaben, tebufenpyrad, *Bacillus thuringiensis, Bacillus thuringiensis* delta endotoxin, baculovirus, and entomopathogenic bacteria, virus and fungi.

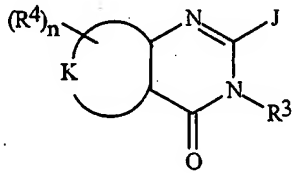
31. The method of Claim 30 wherein at least one additional biologically active compound or agent is selected from insecticide, nematocide, acaricide or biological agents in the group consisting of cypermethrin, cyhalothrin, cyfluthrin and beta-cyfluthrin, esfenvalerate, fenvalerate, tralomethrin, fenothicarb, methomyl, oxamyl, thiodicarb,

clothianidin, imidacloprid, thiacloprid, indoxacarb, spinosad, abamectin, avermectin, emamectin, endosulfan, ethiprole, fipronil, flufenoxuron, triflumuron, diofenolan, pyriproxyfen, pymetrozine, amitraz, *Bacillus thuringiensis*, *Bacillus thuringiensis* delta endotoxin and entomophagous fungi.

32. The method of Claim 1 wherein at least one insect pest controlled is selected from the group consisting of *Alabama argillacea* Hübner (cotton leaf worm), *Archips argyrospila* Walker (fruit tree leaf roller), *A. rosana* Linnaeus (European leaf roller) and other *Archips* species, *Chilo suppressalis* Walker (rice stem borer), *Cnaphalocrosis medinalis* Guenee (rice leaf roller), *Crambus caliginosellus* Clemens (corn root webworm), *Crambus teterrellus* Zincken (bluegrass webworm), *Cydia pomonella* Linnaeus (codling moth), *Earias insulana* Boisduval (spiny bollworm), *Earias vittella* Fabricius (spotted bollworm), *Helicoverpa armigera* Hübner (American bollworm), *Helicoverpa zea* Boddie (corn earworm), *Heliothis virescens* Fabricius (tobacco budworm), *Herpetogramma licarsisalis* Walker (sod webworm), *Lobesia botrana* Denis & Schiffermüller (grape berry moth), *Pectinophora gossypiella* Saunders (pink bollworm), *Phyllocnistis citrella* Stainton (citrus leafminer), *Pieris brassicae* Linnaeus (large white butterfly), *Pieris rapae* Linnaeus (small white butterfly), *Plutella xylostella* Linnaeus (diamondback moth), *Spodoptera exigua* Hübner (beet armyworm), *Spodoptera litura* Fabricius (tobacco cutworm, cluster caterpillar), *Spodoptera frugiperda* J. E. Smith (fall armyworm), *Trichoplusia ni* Hübner (cabbage looper) and *Tuta absoluta* Meyrick (tomato leafminer), *Acyrthisiphon pisum* Harris (pea aphid), *Aphis craccivora* Koch (cowpea aphid), *Aphis fabae* Scopoli (black bean aphid), *Aphis gossypii* Glover (cotton aphid, melon aphid), *Aphis pomi* De Geer (apple aphid), *Aphis spiraecola* Patch (spirea aphid), *Aulacorthum solani* Kaltenbach (foxglove aphid), *Chaetosiphon fragaefolii* Cockerell (strawberry aphid), *Diuraphis noxia* Kurdjumov/Mordvilko (Russian wheat aphid), *Dysaphis plantaginea* Paaserini (rosy apple aphid), *Eriosoma lanigerum* Hausmann (woolly apple aphid), *Hyalopterus pruni* Geoffroy (mealy plum aphid), *Lipaphis erysimi* Kaltenbach (turnip aphid), *Metopolophium dirrhodum* Walker (cereal aphid), *Macrosipum euphorbiae* Thomas (potato aphid), *Myzus persicae* Sulzer (peach-potato aphid, green peach aphid), *Nasonovia ribisnigri* Mosley (lettuce aphid), *Pemphigus* spp. (root aphids and gall aphids), *Rhopalosiphum maidis* Fitch (corn leaf aphid), *Rhopalosiphum padi* Linnaeus (bird cherry-oat aphid), *Schizaphis graminum* Rondani (greenbug), *Sitobion avenae* Fabricius (English grain aphid), *Therioaphis maculata* Buckton (spotted alfalfa aphid), *Toxoptera aurantii* Boyer de Fonscolombe (black citrus aphid), and *Toxoptera citricida* Kirkaldy (brown citrus aphid); *Adelges* spp. (adelgids); *Phylloxera devastatrix* Pergande (pecan phylloxera); *Bemisia tabaci* Gennadius (tobacco whitefly, sweetpotato whitefly), *Bemisia argentifolii* Bellows & Perring (silverleaf whitefly), *Dialeurodes citri* Ashmead (citrus whitefly) and *Trialeurodes vaporariorum* Westwood (greenhouse whitefly); *Empoasca fabae* Harris (potato leafhopper), *Laodelphax striatellus*

Fallen (smaller brown planthopper), *Macrolestes quadrilineatus* Forbes (aster leafhopper), *Nephotettix cinticeps* Uhler (green leafhopper), *Nephotettix nigropictus* Stål (rice leafhopper), *Nilaparvata lugens* Stål (brown planthopper), *Peregrinus maidis* Ashmead (corn planthopper), *Sogatella furcifera* Horvath (white-backed planthopper), *Sogatodes orizicola* Muir (rice delphacid), *Typhlocyba pomaria* McAtee white apple leafhopper, *Erythroneoura* spp. (grape leafhoppers); *Magicidada septendecim* Linnaeus (periodical cicada); *Icerya purchasi* Maskell (cottony cushion scale), *Quadraspidiotus perniciosus* Comstock (San Jose scale); *Planococcus citri* Risso (citrus mealybug); *Pseudococcus* spp. (other mealybug complex); *Cacopsylla pyricola* Foerster (pear psylla), *Trioza diospyri* Ashmead (persimmon psylla), *Acrosternum hilare* Say (green stink bug), *Anasa tristis* De Geer (squash bug), *Blissus leucopterus leucopterus* Say (chinch bug), *Corythuca gossypii* Fabricius (cotton lace bug), *Cyrtopeltis modesta* Distant (tomato bug), *Dysdercus suturellus* Herrich-Schäffer (cotton stainer), *Euchistus servus* Say (brown stink bug), *Euchistus variolarius* Palisot de Beauvois (one-spotted stink bug), *Graptosthetus* spp. (complex of seed bugs), *Leptoglossus corculus* Say (leaf-footed pine seed bug), *Lygus lineolaris* Palisot de Beauvois (tarnished plant bug), *Nezara viridula* Linnaeus (southern green stink bug), *Oebalus pugnax* Fabricius (rice stink bug), *Oncopeltus fasciatus* Dallas (large milkweed bug), *Pseudatomoscelis seriatus* Reuter (cotton fleahopper), *Frankliniella occidentalis* Pergande (western flower thrip), *Scirthothrips citri* Moulton (citrus thrip), *Sericothrips variabilis* Beach (soybean thrip), and *Thrips tabaci* Lindeman (onion thrip), *Leptinotarsa decemlineata* Say (Colorado potato beetle), *Epilachna varivestis* Mulsant (Mexican bean beetle) and wireworms of the genera *Agriotes*, *Athous* or *Limonius*).

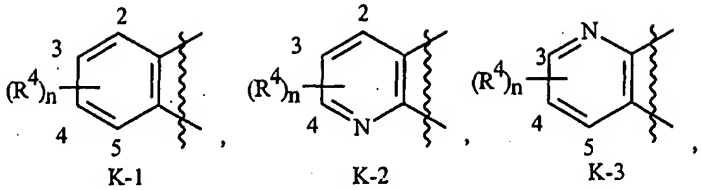
33. A compound of Formula Ia, its *N*-oxide or an agriculturally suitable salt of the compound

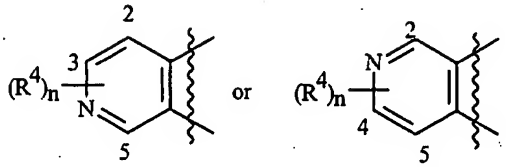


Ia

wherein

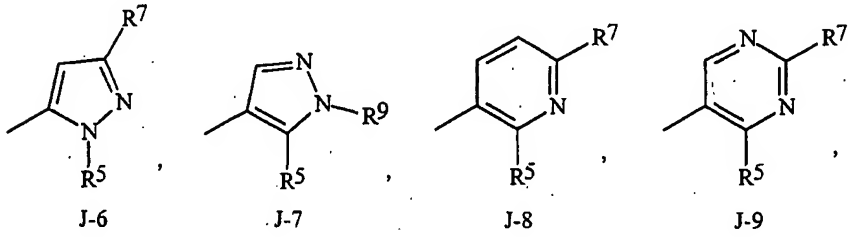
K is, together with the two contiguous linking carbon atoms, a fused phenyl or a fused pyridinyl ring selected from the group consisting of K-1, K-2, K-3, K-4 and K-5, each optionally substituted with 1 to 4 R^4

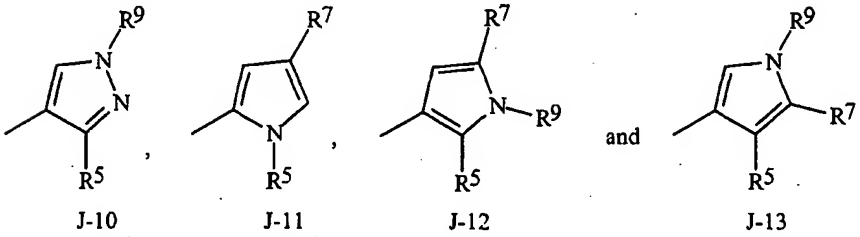




;

J substituted with 1 to 3 R^5 is selected from the group consisting of J-6, J-7, J-8, J-9, J-10, J-11, J-12 and J-13





;

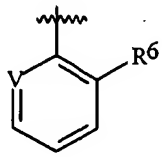
R^3 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl or C_3-C_6 cycloalkyl each optionally substituted with one or more substituents selected from the group consisting of halogen, CN, C_1-C_2 alkoxy, C_1-C_2 alkylthio, C_1-C_2 alkylsulfinyl and C_1-C_2 alkylsulfonyl;

one R^4 group is attached to the K-ring at the 2-position or 5-position, and said R^4 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, or C_1-C_4 haloalkylsulfonyl; and

an optional second R^4 is H, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_1-C_6 haloalkyl, C_2-C_6 haloalkenyl, C_2-C_6 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, hydroxy, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy,

C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 haloalkylthio, C_1-C_4 haloalkylsulfinyl, C_1-C_4 haloalkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_1–C_4 alkoxyalkyl, C_1–C_4 hydroxyalkyl, $C(O)R^{10}$, CO_2R^{10}, $C(O)NR^{10}R^{11}$, $NR^{10}R^{11}$, $N(R^{11})COR^{10}$, $N(R^{11})CO_2R^{10}$ or C_3-C_6 trialkylsilyl;

R^5 is



;

V is N, CH, CF, CCl, CBr or CI;

each R^6 is independently C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_3-C_6 cycloalkyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl, C_2-C_4 haloalkynyl, C_3-C_6 halocycloalkyl, halogen, CN, NO_2, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_1-C_4 alkylthio, C_1-C_4 alkylsulfinyl, C_1-C_4 alkylsulfonyl, C_1-C_4 alkylamino, C_2-C_8 dialkylamino, C_3-C_6 cycloalkylamino, C_3-C_6 (alkyl)cycloalkylamino, C_2-C_4 alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6 alkylaminocarbonyl, C_3-C_8 dialkylaminocarbonyl or C_3-C_6 trialkylsilyl;

each R^7 is independently H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, halogen, CN, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy or C_1-C_4 haloalkylthio;

R^9 is H, C_2-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_6 alkenyl, C_3-C_6 haloalkenyl, C_3-C_6 alkynyl or C_3-C_6 haloalkynyl, provided that R^7 and R^9 are not both H;

R^{10} is H or C_1–C_4 alkyl or C_1–C_4 haloalkyl;

R^{11} is H or C_1–C_4 alkyl; and

n is 0, 1 or 2.

34. The compound of Claim 33 wherein

J substituted with 1 to 3 R^5 is J-6;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and

p is 0, 1 or 2.

35. The compound of Claim 34 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

36. The compound of Claim 33 wherein
J substituted with 1 to 3 R^5 is J-7;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1 or 2.

37. The compound of Claim 36 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

38. The compound of Claim 33 wherein
J substituted with 1 to 3 R^5 is J-8;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN R^6 is CH_3, CF_3 or halogen;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

39. The compound of Claim 38 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is halogen or CF_3.

40. The compound of Claim 33 wherein
J substituted with 1 to 3 R^5 is J-9;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3 or halogen; and
p is 0, 1 or 2.

41. The compound of Claim 40 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^7 is CF_3.

42. The compound of Claim 33 wherein
J substituted with 1 to 3 R^5 is J-10;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and
p is 0, 1 or 2.

43. The compound of Claim 42 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is Cl or Br; and
R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

44. The compound of Claim 33 wherein
J substituted with 1 to 3 R^5 is J-11;
R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;
a second R^4 is H, F, Cl, Br, I or CF_3;
R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;
R^7 is CH_3, CF_3, $OCHF_2$ or halogen; and
p is 0, 1 or 2.

45. The compound of Claim 44 wherein
R^3 is C_1-C_4 alkyl;
one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;
a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^7 is halogen or CF_3.

46. The compound of Claim 33 wherein

J substituted with 1 to 3 R^5 is J-12;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and

p is 0, 1 or 2.

47. The compound of Claim 46 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

48. The compound of Claim 33 wherein

J substituted with 1 to 3 R^5 is J-13;

R^3 is C_1-C_4 alkyl optionally substituted with halogen, CN, OCH_3, $S(O)_pCH_3$;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, CF_3, OCF_3, $OCHF_2$, $S(O)_pCF_3$, $S(O)_pCHF_2$, CN or halogen;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is C_1-C_4 alkyl, C_1-C_4 haloalkyl, halogen or CN;

R^9 is C_2-C_6 alkyl or C_1-C_6 haloalkyl; and

p is 0, 1 or 2.

49. The compound of Claim 48 wherein

R^3 is C_1-C_4 alkyl;

one R^4 group is attached to the K-ring at the 2-position and said R^4 is CH_3, Cl or Br;

a second R^4 is H, F, Cl, Br, I or CF_3;

R^6 is Cl or Br; and

R^9 is CF_3, CHF_2, $CBrF_2$, $CClF_2$, CH_2CF_3, or CF_2CHF_2.

50. The compound of Claim 33 selected from the group consisting of:

8-methyl-3-(1-methylethyl)-2-[2-methyl-6-(trifluoromethyl)-3-pyridinyl]-4(3*H*)-quinazolinone,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3,8-dimethyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-ethyl-8-methyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6-chloro-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
6-chloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3,8-dimethyl-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-8-methyl-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
6-chloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-8-methyl-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1,1-dimethylethyl)-8-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline,
6,8-dichloro-2-[1-(3-chloro-2-pyridinyl)-3-(trifluoromethyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline,
2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-methyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-ethyl-4(3*H*)-quinazoline,

2-[3-bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-6,8-dichloro-3-(1-methylethyl)-4(3*H*)-quinazoline;

6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-methyl-4(3*H*)-quinazoline,

6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-ethyl-4(3*H*)-quinazoline, and

6,8-dichloro-2-[3-chloro-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3-(1-methylethyl)-4(3*H*)-quinazoline.

51. A composition for controlling an invertebrate pest comprising a biologically effective amount of a compound of Formula Ia of Claim 33 and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents.

52. A composition for controlling an invertebrate pest comprising a biologically effective amount of a compound of Formula Ia of Claim 33 and an effective amount of at least one additional biologically active compound or agent.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 June 2002 (20.06.2002)

PCT

(10) International Publication Number
WO 02/048115 A3

(51) International Patent Classification[7]: C07D 401/04, 239/91, 401/10, 403/04, 403/14, 471/04, A01N 43/90, 43/54

(21) International Application Number: PCT/US01/46629

(22) International Filing Date: 3 December 2001 (03.12.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/254,614 11 December 2000 (11.12.2000) US

(71) Applicant *(for all designated States except US)*: **E. I. DU PONT DE NEMOURS AND COMPANY** [US/US]; 1007 Market Street, Wilmington, DE 19898 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ANNIS, Gary, David** [US/US]; 13 Franklin Road, Landenberg, PA 19350 (US). **MYERS, Brian, James** [US/US]; 102 East Ruddy Duck Circle, Oxford, PA 19363 (US). **SELBY, Thomas, Paul** [US/US]; 116 Hunter Court, Wilmington, DE 19808 (US). **STEVENSON, Thomas, Martin** [US/US]; 103 Iroquois Court, Newark, DE 19702 (US). **ZIMMERMAN, William, Thomas** [US/US]; 1 Evans Drive, Landenberg, PA 19350 (US).

(74) Agent: **BIRCH, Linda, D.**; E. I. Du Pont de Nemours and Company, Legal Patent Records Center, 1007 Market Street, Wilmington, DE 19898 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

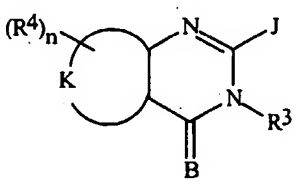
Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
6 September 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 02/048115 A3

(54) Title: QUINAZOLINONES AND PYRIDINOPYRIMIDINONES FOR CONTROLLING INVERTEBRATE PESTS



(I)

(57) Abstract: This invention provides methods for controlling invertebrate pests comprising contacting the pests or their environment with an arthropodicidally effective amount of a compound of Formula (I), its N-oxides or agriculturally suitable salts wherein B, J, K, R^3 and R^4 and n are as defined in the disclosure. This invention also pertains to certain compounds of Formula (I) and compositions for controlling invertebrate pests comprising a biologically effective amount of a compound of Formula I and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/46629

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07D401/04 C07D239/91 C07D401/10 C07D403/04 C07D403/14
C07D471/04 A01N43/90 A01N43/54

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C07D A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, CHEM ABS Data, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 14202 A (NOVARTIS ERFIND VERWALT GMBH ;NOVARTIS AG (CH); WALTER HARALD (CH)) 25 March 1999 (1999-03-25) cited in the application claims	1-32
A	claims	33,51,52
X	US 5 378 678 A (TICE COLIN M) 3 January 1995 (1995-01-03) claims column 4; example 5; table 1	1-32
A	claims	33,51,52
X	US 6 114 340 A (BUSCHHAUS HERBERT ET AL) 5 September 2000 (2000-09-05) claims column 2, line 36,37	1-32

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 May 2002	28/06/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Stix-Malaun, E

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/46629

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 998 455 A (KUENG RUTH BEATRICE ET AL) 7 December 1999 (1999-12-07) claims column 2, line 46,47	1-32
X	EP 0 579 424 A (ROHM & HAAS) 19 January 1994 (1994-01-19) claims page 14, line 23; example 225; table 1A	1-32
A	claims	33,51,52
X	EP 0 696 588 A (ROHM & HAAS) 14 February 1996 (1996-02-14) claims	1-32
A	claims	33,51,52
X	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE,COLUMBUS OHIO; GUPTA,ANIL K. SEN ET AL: "SYNTHESIS AND PESTICIDAL ACTIVITY OF SOME QUINAZOLIN-4(3H)-ONE DERIVATIVES" XP002198895 abstract & PESTIC.SCI., vol. 26, no. 1, 1989, page 41-9	1-32
X	DATABASE CHEMABS 'Online! CHEMICAL ABSRACTS SERVICE,COLUMBUS OHIO; CHAURASIA M.R.ETAL: "SYNTHESIS OF SOME NEW 4 (3H) QUINAZOLINONES AS POTENTIAL FUNGICIDES" XP002198896 abstract & J.NEPAL CHEM.SOC., vol. 1, no. 1, 1981, pages 11-17,	1-32

INTERNATIONAL SEARCH REPORT

ternational application No.
PCT/US 01/46629

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: -
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Present claims 50/27 relate to an extremely large number of possible quinazolines which are not dependent on the quinazolinones of claims 1/33. Claims 27/50 therefore lack a meaningful generic expression. Accordingly a lack of clarity (and/or conciseness) within the meaning of Article 6 PCT arises to such an extent as to render a meaningful search of claims 27/50 impossible. Consequently, the search has been carried out for those parts of the application which do appear to be clear (and/or concise), namely compounds which are covered by the generic expressions of formula (I) and therefore (Ia) of claims 1 and 33.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 01/46629

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9914202 A	25-03-1999	AU	743717 B2	31-01-2002
		AU	9742998 A	05-04-1999
		BR	9812439 A	26-09-2000
		CA	2301694 A1	25-03-1999
		CN	1270593 T	18-10-2000
		WO	9914202 A2	25-03-1999
		EP	1015434 A2	05-07-2000
		HU	0002423 A2	28-11-2000
		JP	2001516749 T	02-10-2001
		PL	339053 A1	04-12-2000
		TR	200000713 T2	21-08-2000
		US	6277858 B1	21-08-2001
		ZA	9808336 A	12-02-1999
US 5378678 A	03-01-1995	US	5451565 A	19-09-1995
		AT	144500 T	15-11-1996
		AU	4178193 A	20-01-1994
		BR	9302897 A	16-02-1994
		CA	2099928 A1	18-01-1994
		CN	1081440 A	02-02-1994
		DE	69305587 D1	28-11-1996
		DK	579424 T3	18-11-1996
		EP	0579424 A1	19-01-1994
		EP	0696588 A1	14-02-1996
		ES	2093929 T3	01-01-1997
		GR	3021451 T3	31-01-1997
		HK	7797 A	24-01-1997
		HU	65082 A2	28-04-1994
		JP	6087835 A	29-03-1994
		MX	9304222 A1	29-04-1994
		NZ	248090 A	27-02-1996
		TR	960437 A2	21-06-1996
US 6114340 A	05-09-2000	AU	734978 B2	28-06-2001
		AU	3349897 A	21-01-1998
		CA	2257161 A1	08-01-1998
		EP	0907320 A2	14-04-1999
		WO	9800021 A1	08-01-1998
		JP	2000513371 T	10-10-2000
		PL	330878 A1	07-06-1999
		ZA	9705672 A	12-05-1998
US 5998455 A	07-12-1999	AT	206006 T	15-10-2001
		AU	690464 B2	23-04-1998
		AU	6125196 A	15-01-1997
		BR	9608358 A	18-08-1998
		CA	2224977 A1	03-01-1997
		CZ	9704040 A3	13-05-1998
		DE	69615552 D1	31-10-2001
		DE	69615552 T2	18-04-2002
		DK	831698 T3	21-01-2002
		WO	9700012 A1	03-01-1997
		EP	0831698 A1	01-04-1998
		ES	2164248 T3	16-02-2002
		HU	9802198 A2	28-01-1999
		JP	11507655 T	06-07-1999
		NZ	310452 A	29-09-1999
		PL	323945 A1	27-04-1998

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 01/46629

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5998455 A		TR 9701619 T1	21-05-1998
		ZA 9605080 A	17-12-1996
EP 0579424 A	19-01-1994	US 5300477 A	05-04-1994
		AT 144500 T	15-11-1996
		AU 4178193 A	20-01-1994
		BR 9302896 A	16-02-1994
		CA 2099925 A1	18-01-1994
		CN 1084165 A	23-03-1994
		DE 69305587 D1	28-11-1996
		DK 579424 T3	18-11-1996
		EP 0579424 A1	19-01-1994
		EP 0696588 A1	14-02-1996
		ES 2093929 T3	01-01-1997
		GR 3021451 T3	31-01-1997
		HK 7797 A	24-01-1997
		HU 65082 A2	28-04-1994
		JP 6312980 A	08-11-1994
		KR 133083 B1	14-04-1998
		NZ 248090 A	27-02-1996
		TR 960437 A2	21-06-1996
		US 5726124 A	10-03-1998
		ZA 9305033 A	17-01-1994
		BR 9302897 A	16-02-1994
		CA 2099928 A1	18-01-1994
		CN 1081440 A	02-02-1994
		JP 6087835 A	29-03-1994
		MX 9304222 A1	29-04-1994
		US 5378678 A	03-01-1995
		US 5451565 A	19-09-1995
		US 5453414 A	26-09-1995
EP 0696588 A	14-02-1996	US 5300477 A	05-04-1994
		EP 0696588 A1	14-02-1996
		AT 144500 T	15-11-1996
		AU 4178193 A	20-01-1994
		BR 9302896 A	16-02-1994
		CA 2099925 A1	18-01-1994
		CN 1084165 A	23-03-1994
		DE 69305587 D1	28-11-1996
		DK 579424 T3	18-11-1996
		EP 0579424 A1	19-01-1994
		ES 2093929 T3	01-01-1997
		GR 3021451 T3	31-01-1997
		HK 7797 A	24-01-1997
		HU 65082 A2	28-04-1994
		JP 6312980 A	08-11-1994
		KR 133083 B1	14-04-1998
		NZ 248090 A	27-02-1996
		TR 960437 A2	21-06-1996
		US 5726124 A	10-03-1998
		ZA 9305033 A	17-01-1994
		BR 9302897 A	16-02-1994
		CA 2099928 A1	18-01-1994
		CN 1081440 A	02-02-1994
		JP 6087835 A	29-03-1994
		MX 9304222 A1	29-04-1994
		US 5378678 A	03-01-1995

INTERNATIONAL SEARCH REPORT

Information on patent family members

stional Application No
PCT/US 01/46629

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0696588 A		US 5451565 A	19-09-1995
		US 5453414 A	26-09-1995